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**SNOW SURVEY and WATER SUPPLY FORECASTS**  
for  
**MONTANA & NORTHERN WYOMING**

UNITED STATES DEPARTMENT of AGRICULTURE--SOIL CONSERVATION SERVICE,  
and  
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, U.S. Geological Survey, National Park Service, State Engineers of Montana and Wyoming and other Federal, State, and private organizations.

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# UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

## To Recipients of Cooperative Snow Survey and Water Supply Forecast Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

### PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
<b>RIVER BASINS</b>			
COLORADO AND STATE OF UTAH	MONTHLY (JAN.-MAY)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER AND OTHER AGENCIES
COLUMBIA	MONTHLY (JAN.-MAY)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
UPPER MISSOURI AND STATE OF MONTANA	MONTHLY (FEB.-MAY)	BOZEMAN MONTANA	MONT. AGR. EXP. STATION
WEST-WIDE	OCT. 1, APR. 1, MAY 1	PORTLAND, OREGON	ALL COOPERATORS
<b>STATES</b>			
ALASKA	MONTHLY (MAR.-MAY)	PALMER, ALASKA	ALASKA S.C.D.
ARIZONA	SEMI-MONTHLY (JAN.15 - APR.1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. AGR. EXP. STATION COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (FEB.-MAY)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
NEVADA	MONTHLY (FEB.-APR.)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-MAY)	PORTLAND, OREGON	ORE. AGR. EXP. STATION OREGON STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-MAY)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB. JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

Copies of these various reports may be secured from: Head, Water Supply Forecasting Section  
Soil Conservation Service  
209 S. W. Fifth Ave., Portland 4, Oregon

### PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	COMPTROLLER, WATER RIGHTS BR., DEPT. OF LANDS AND FORESTS, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIF. DEPT. OF WATER RESOURCES, SACRAMENTO, CALIF.



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FEDERAL-STATE-PRIVATE COOPERATIVE  
SNOW SURVEYS and WATER SUPPLY FORECASTS  
For  
MONTANA AND NORTHERN WYOMING  
(Upper Missouri and Upper Columbia River Basins)

Report Prepared  
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MONTANA  
WATER SUPPLY OUTLOOK  
as of  
April 1, 1961

\* \* \* \* \*

\* The 1961 Water Supply Outlook for the current irri-  
\* gation season is POOR in the Missouri Basin and FAIR  
\* to GOOD in the Columbia Basin in Montana.  
\*  
\* \* \* \* \*

IRRIGATION WATER SUPPLY

Critical areas exist on the headwaters of the Beaverhead, Ruby, Clarks Fork and Rock Creek of the Yellowstone and Musselshell Rivers. A Fair water supply is forecast for the Madison, Gallatin and Sun-Teton-Marias River basins.

The Yellowstone River is forecast to flow only 72 percent average at the headwaters. The potential supply for the irrigation season gradually decreases downstream to 51 percent average at Sidney. The Missouri River Main Stem at Toston is forecast to produce only 66 percent average flow to Canyon Ferry from April through September. This water supply dwindles at downstream stations to 64 percent average flow entering Fort Peck Reservoir below Zortman. With both the Missouri and Yellowstone being forecast considerably below average, anticipated flow into Garrison Reservoir at Williston, North Dakota is forecast at 56 percent average during the irrigation season.

On the Columbia Basin, prospects are for a Poor to Good water supply during the April-September period. The Kootenai River at Libby is expected to flow 101 percent average. The Flathead River at Columbia Falls is forecast at 97 percent average. The South Fork of the Flathead River below Hungry Horse Dam is forecast to flow 91 percent average, or 2,090,000 acre feet of water from April first through September 30. The Clark Fork River snow-pack is confined to extremely high elevations, with practically none in the large low elevation areas. As a result, the anticipated flow is forecast at 62 percent average above Missoula. The Bitterroot is better and is forecast at 77 percent average. These figures project downstream to St. Regis and should produce 71 percent average. The higher percentage flow from the Flathead raises the prospective flow at Plains to 86 percent average.



## SNOW COVER

Snow cover at low elevations over the majority of the State is gone. April first surveys in the Marias, Sun and Teton drainage indicate this year's snow-pack is 36 percent more than last year's and is 68 percent of the 1943-57 average. The Missouri Main Stem has a snow-pack that is 79 percent of last year and 59 percent average. Over the Beaverhead-Jefferson basins, this year's snow-pack is 4 percent greater than last year, but only 65 percent average. In the Judith-Musselshell area, this year's snow-pack is only 55 percent of last year and 47 percent of the 1943-57 average. The Upper Yellowstone drainage is covered with a snow-pack that is 15 percent greater than last year's, which is 72 percent average.

On the West side of the Divide, the Kootenai above Libby has a snow-pack which is 38 percent more than last year's and is 103 percent of the 1943-57 average. The Flathead shows 3 percent more than last year and 11 percent less than average.

The Lower Clark Fork shows 124 percent more than last year; this is 93 percent average. The Upper Clark Fork is covered with a snow-pack that is 99 percent of last year and 68 percent average. The Bitterroot drainage snow-pack is 13 percent more than last year, but only 75 percent average.

## PRECIPITATION

Since the first of the year, precipitation at valley stations in the Missouri basin has been about 65 percent normal, with the exception of the northeastern diversion at 80 percent normal and the southeastern diversion at 90 percent normal.

West of the Divide, precipitation since the first of the year has been 112 percent of normal.

## SOIL MOISTURE

Soil moisture has improved slightly in the valley areas, but is still deficient in most areas. Soil underlying the mountain snow-pack is dry.

## WINTER STREAMFLOW CONDITIONS

West of the Continental Divide, streamflow is above median; East of the Continental Divide, streamflow is below median near the Divide and diminishes to much below median in the southeastern part of the State.

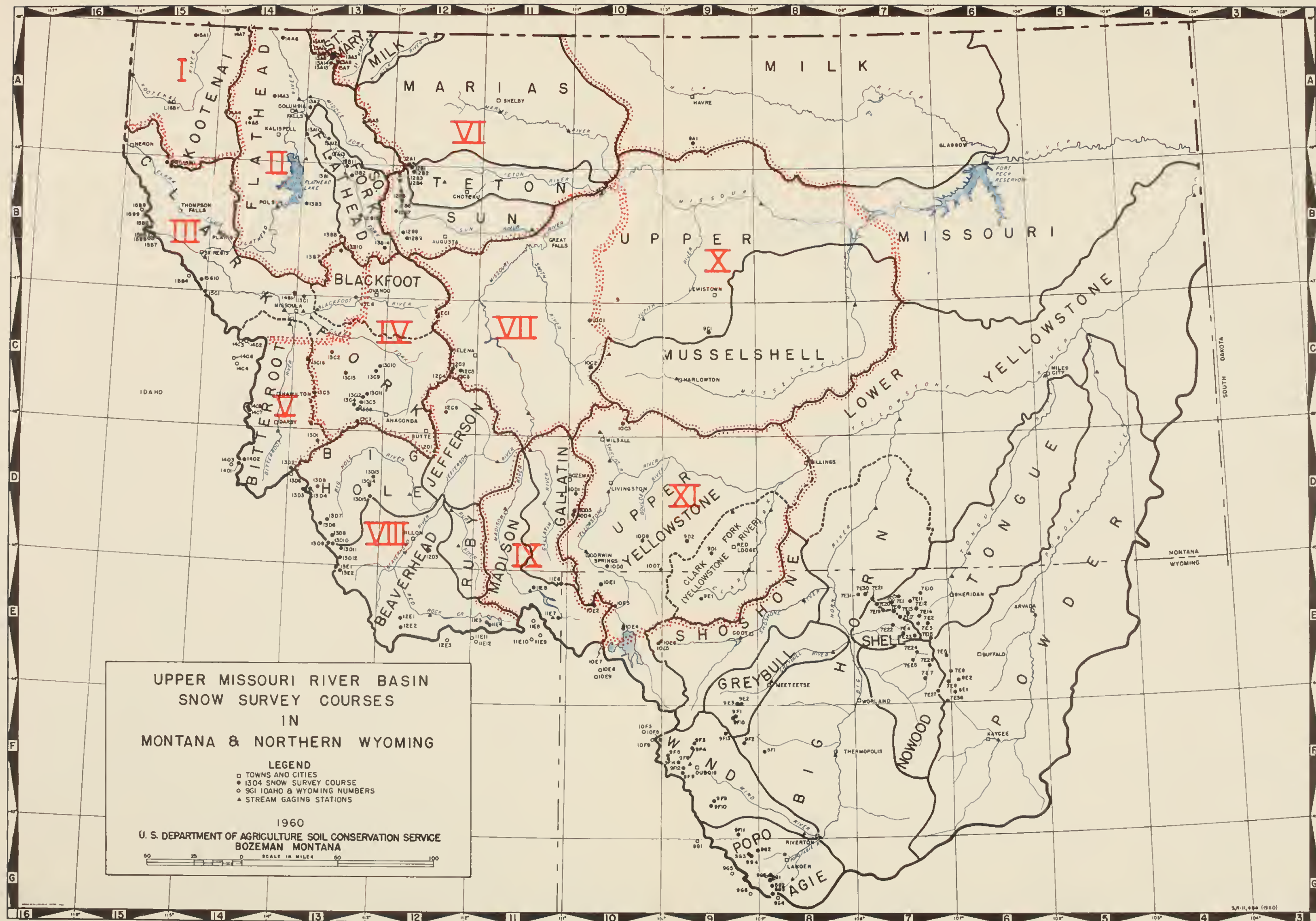
## IRRIGATION RESERVOIR STORAGE

Irrigation reservoirs are still below average for the first of April.



INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

Location									Location									Location								
Drainage Basin and Course Name	Montana Number	Elev.	Sec. Lat.	Twp.	Range Long.	Record Began	Measuring Dates	Measured By	Drainage Basin and Course Name	Montana Number	Elev.	Sec. Lat.	Twp.	Range Long.	Record Began	Measuring Dates	Measured By	Drainage Basin and Course Name	Montana Number	Elev.	Sec. Lat.	Twp.	Range Long.	Record Began	Measuring Dates	Measured By
JEFFERSON RIVER									MISSOURI RIVER DRAINAGE (cont.)									MISSOURI RIVER DRAINAGE (cont.)								
(ROCK-SHAVERHEAD)									(UPPER YELLOWSTONE)									(TONGUE RIVER cont.)								
Lakeview Ridge	11E3	7400	27	14S	2W	1948	3,4,5	10	Camp Senia Canyon	9D1 10E3	7890 7750	2 44°-44'	8S	18E 110°-30'	1937 1938	4 1,2,3,4,5	1 6	Horse Trail Div.	7E19	9200	29	55N	90W	1956	2,3,4,5	1
Lakeview Canyon	11E4	6930	26	14S	2W	1948	3,4,5	10	Cooke City	10D7	7400	25	9S	14E	1937	1,2,3,4,5	6	Lake Geneva	7E16	9000	7	52N	86W	1956	2,3,4,5	1
Limetkin	12E2	6950	5	15S	9W	1948	3,4	1	Crevice Mt.	10D5	8400	22	9S	9E	1935	3,4	2	North Tongue	7E15	8800	17	55N	89W	1956	2,3,4,5	1
White Pine Ridge	12E1	8850	18	14S	9W	1948	3,4	1	Independence	10D6	8000	22	7S	12E	1940	3,4	1	Sibley Lake	7E11	8000	10	55N	88W	1956	2,3,4,5	1
(HORSE PRAIRIE)									Lake Camp	10E4	7850	44°-34'		110°-24'	1934	1,2,3,4,5	6	Sucker Creek	7E12	9000	19	55N	87W	1956	2,3,4,5	1
Bloody Dick	13D10	7600	12	8S	16W	1948	3,4	1	Lupine Creek	10E1	7300	44°-54'		110°-37'	1938	1,2,3,4,5	6	Steamboat Point	7E10	7500	32	56N	87W	1956	2,3,4,5	1
Gold Stone	13D9	8100	11	8S	16W	1948	3,4	1	Lodgepole	9E1	8200	32	56N	106W	1940	2,3,4,5	1,4	Wood Rock G.S.	7E13	8500	3	54N	88W	1956	2,3,4,5	1
Lemhi Pass	13E1	7480	9	10S	15W	1948	3,4	1	West Rosebud	9D2	7500	10	7S	16E	1460	1,2,3,4,5	4	(POWDER RIVER) Wyoming								
Terrell Creek	13U12	6650	14	9S	15W	1948	3,4	1	(SHIELDS RIVER)									Crezy Woman	6E2	8200	6	47N	84N	1956	2,3,4,5	1
Trail Creek	13E2	7090	15	10S	15W	1948	3,4	1	Porcupine	10C3	6500	10	4N	10E	1938	3,4	1	Muddy Creek O.S.	6E1	7400	2	48N	84N	1956	2,3,4,5	1
Selway Junction	13U11	6800	27	8S	15W	1948	3,4	1	LOWER YELLOWSTONE									Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1
(BIG HOLE)									(WIND RIVER) Wyoming									North Powder #2	7E36	8300	20	47N	85W	1956	2,3,4,5	1
Big Hole Pass	13U3	7240	28	3S	18W	1948	3,4	1	Big Warm	9F12	8800	36	42N	109W	1955	2,3,4,5	1	Onion Gulch	7E27	8100	31	48N	85W	1956	2,3,4,5	1
Big Hole Pass-Be.	13U4	6900	24	3S	17W	1948	3,4	1	Brooke Lake #3	10F8	9200	23	44N	110W	1939	2,3,4,5	1	Soldier Park	7E5	8700	36	51N	85W	1950	2,3,4,5	1
East Boundary	13U5	6700	22	3S	17W	1948	3,4	1	Burroughs Creek	9F4	8800	15	43N	107W	1948	2,3,4,5	1	Sour Dough	7E6	8500	17	49N	84W	1936	2,3,4,5	1
Gibbons Pass	13U2	7100	4	2S	19W	1934	1,2,3,4,5	1,3	Dinwoodie	9F10	10000	21	39N	105W	1948	2,3,4,5	1	COLUMBIA RIVER BASIN								
Jahnke Creek	13U8	7340	25	7S	16W	1948	3,4	1	Dry Creek	9F9	9500	34	4N	6W	1948	2,3,4,5	1	KOOTENAI RIVER								
Miner Forks	13U6	7300	24	6S	17W	1948	3,4	1	DuNoir	9F6	8750	27	42N	108W	1940	2,3,4,5	1	Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5½	2
Miner Lake	13U7	6720	10	6S	16W	1945	3,4,5	1	East Fork	9F13	9200	23	44N	104W	1956	2,3,4,5	1	Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5½	2
(WISE RIVER)									Geyser Creek	9F7	8500	12	44N	108W	1948	2,3,4,5	1	Red Mountain	15A1	6000	4	36N	29W	1937	3,4,5,5½	1,2
Anderson Mdw.	13D14	7000	18	3S	12W	1948	3,4	1	Little Warm	9F8	9500	24	44N	108W	1948	2,3,4,5	1	Weasel Divide	14A7	5450	8	37N	24W	1955	4,5,5½	1,2
Elk Horn	13D15	8450	15	4S	12W	1935	3,4,5	3	Sheridan R.S. #1	9F5	7500	3	42N	109W	1939	2,3,4,5	1	FLATHEAD RIVER								
Wise River	13D13	6300	15	2S	12W	1948	3,4	1	Sheridan R.S. #2	9F14	7500	3	42N	109W	1955	2,3,4,5	1	Basin Creek	13B14A	5000	11	19N	12W	1951	2,3,4,5	2
(RUBY RIVER)									T-Cross Ranch	9F3	8000	1	43N	107W	1940	2,3,4,5	1	Big Creek	13B3	6750	647	22N	14W	1941	3,4,5	5
Flashlight	12D3	6950	22	8S	7W	1945	3,4,5	1	Togwotee Pass	10F9	9600	29	44N	110W	1936	2,3,4,5	11	Brush Creek	14A4	5000	13	30N	26W	1937	3,4,5	1,2
MADISON RIVER									(POPO AGIE RIVER) Wyoming									Cattle Queen	13A1	4700	7	35N	17W	1939	3,4,5	6
Hebren	11E5	6550	22	11S	3E	1934	1,2,3,4,5	3	Blue Ridge	8G2	9500	23	31N	101W	1939	2,3,4,5	1	Desert Mountain	13A2M	5600	24	31N	19W	1937	1,2,3,4,5	1,2
West Yellowstone	11E7	6700	34	13S	5E	1934	1,2,3,4,5	3	Bruce's Camp	8G5	6500	24	32N	101W	1955	2,3,4,5	1	Hell Roaring Div.	14A3	5770	35	32N	22W	1942	3,4,5	1,2
Norris Basin	10E2	7500	44°44'		110°-42'	1936	3,4	6	Hobb's Park	9G3	10000	22	2S	3W	1948	2,3,4,5	1	Holbrook	13B13A	4530	18	21N	13W	1951	1,2,3,4,5	2
GALLATIN RIVER									Hosquito Park R.S.	9G4	9500	23	2S	3W	1940	2,3,4,5	1	Kishenehn	14A6	3886	14	37N	22W	1954	4,5	6
Devil's Slide	10U4	8100	14	5S	6E	1935	2,3,4,5	2,1	Sawmill Glade	8G1	8500	3	31N	101W	1939	2,3,4,5	1	Logan Creek	14A5	4300	34	30N	24W	1937	3,4,5	2
Hood Meadow	10D3	6600	22	4S	6E	1935	2,3,4,5	2,1	South Pass	8G3	9000	13	30N	101W	1939	2,3,4,5	1	Marias Pass	13A5M	5250	34	30N	14W	1934	1,2,3,4,5	3
New World	10U1	6700	24	3S	6E	1939	1,2,3,4,5	7	St. Lawrence	9F11	9000	26	1N	4W	1940	2,3,4,5	1	Mineral Creek	13A16	4000	29	35N	17W	1957	3,4,5	6
21-Mile	11E6	7150	1	11S	5E	1934	1,2,3,4,5	3	Trout Creek	9G2	8400	5	2S	2W	1948	2,3,4,5	1	Quintonkon	13A13	3800	11	26N	17W	1951	2,3,4,5	1,2
MISSOURI RIVER MAIN STEM									(OWL CREEK) Wyoming									Spotted Bear Mt.	13B2M	7000	23	25N	15W	1948	3,4,5	1,2
Chessman Reservoir	12C5	6200	2	8N	5W	1936	1,2,3,4,5	3	Beavers Mill	9F2	8900	6	43N	102W	1948	2,3,4,5	1	Strawberry Lake	13A10	6500	11	28N	19W	1948	3,4,5	2
Crystal Lake	9C1	6100	19	12N	18E	1944	3,4	1,2	Owl Creek	8F1	8700	36	43N	101W	1948	2,3,4,5	1	Trinkus Lake	13B1	6500	9	25N	17W	1948	3,4,5	2
Grasshopper	10C2	7000	19	9N	8E	1938	3,4	2	(GREYBULL RIVER) Wyoming									Trout Lake	13A12H	3600	21	28N	17W	1948	3,4,5	1,2
Kings Hill	10C1	7950	35	13N	7E	1934	3,4,5	3	Timber Creek #1	9E2	8800	25-	47N	103W	1948	2,3,4,5	1	Twin Creeks	13B11	3580	14	26N	16W	1951	2,3,4,5	1,2
Picnic Grounds	12C6	6500	10	5N	6W	1944	2,3,4,5	4	Timber Creek #2	9E3	8800	25	47N	103W	1955	2,3,4,5	1	Upper Holland Lk.	13B5	7000	28	20N	16W	1948	3,4,5	2
Pipestone Pass	12C1	7200	10	1N	7W	1938	2,3,4,5	1	Wood River #1	9F1	8000	28	46N	103W	1939	2,3,4,5	1	CLARK FORK								
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	3	Wood River #2	9F15	8000	28	46N	103W	1956	2,3,4,5	1	Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5½	2
Ten Mile Creek L	12C2	6250	13	8N	6W	1935	1,2,3,4,5	3	(SHOSHONE RIVER) Wyoming									Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5½	2
Ten Mile Creek M	12C3	6800	13	8N	6W	1934	1,2,3,4,5	3	East Entrance	10E6	7000	17	52N	109W	1948	1,2,3,4,5	6	Black Pine	13C13	7130	25	8N	15W	1960	3,4,5	1
Ten Mile Creek U	12C4	8000	19	8N	5W	1935	1,2,3,4,5	3	Sylvan Pass	10E5	7100	12	52N	110W	1936	1,2,3,4,5	6	Coyote Hill	13B10	4200	12	18N	16W	1952	1,2,3,4,5	2
(TETON RIVER)									(NOWOOD CREEK) Wyoming									El Dorado Mine	13C9	7800	23	8N	12W	1949	4	1
Freight Creek	12A1	6000	13	26N	10W	1948	3,4	1	Cold Springs Camp	7E25	8700	1	50N	88W	1956	2,3,4,5	1	Fred Burr Pass	13C11	8000	12	6N	13W	1957	3,4,5	1
Waldron Creek	12B2	5600	16	25N	9W	1948	3,4	1	Medicine Lodge Lks	7E24	9500	7</														



COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow Survey Data by Tributary Watersheds April 1, 1961

TRIBUTARY WATERSHED	No. of Courses Averaged	No. Years Used	1961 Snow Water Equivalent Expressed as Percent of	
			1960	1943-57 Average

COLUMBIA RIVER BASIN IN MONTANA

Kootenai above Libby	14	7-15	138	103
Flathead	21	7-15	103	89
Lower Clark Fork	10	5-15	124	93
Upper Clark Fork	15	5-15	99	68
Bitterroot	9	14-15	113	75

MISSOURI RIVER BASIN IN MONTANA

Marias, Teton & Sun	11	9-15	136	68
Missouri Main Stem	7	15	79	59
Beaverhead-Jefferson	31	10-15	104	65
Madison-Gallatin	10	12-15	129	81
Judith-Musselshell	5	15	55	47
Upper Yellowstone	16	9-15	115	72



AVAILABLE SOIL MOISTURE  
as of  
April 1, 1961

Drainage Basin and Station	Station No.	Elev.	Soil Profile in Inches		Date	Soil Moisture Content in Inches About 4/1/61				Y r s
			Depth	Cap.		1961	1960	1959	Avg.	
<u>GALLATIN</u>										
College Site	11D2M	4856	54	14.5	3/31	10.9	12.6	11.6	10.3	4
<u>MADISON</u>										
Red Bluff	11D4M	4800	40	2.9	4/1	2.1	-	-	-	-
<u>SHIELDS</u>										
Battle Ridge	10D11M	6020	48	13.3	3/27	12.6	-	-	-	-
Shields River	10C4M	5850	48	15.9	3/24	13.3	-	-	-	-
<u>FLATHEAD</u>										
Desert Mountain	13A2M	6370	54	6.8	3/27	7.2	8.6	8.0	7.5	4
Marias Pass	13A5M	5250	54	8.4	3/24	6.2	6.6	6.7	6.3	7
Spotted Bear R.S.	13B15M	3700	28	5.9	3/30	5.3	5.3	5.3	5.4	4
Trout Lake	13A12M	3600	54	11.8	3/30	12.5	12.5	12.0	12.4	4

AVAILABLE SOIL MOISTURE  
as of  
October 1, 1960

						1960	1959	1958	Avg.	
<u>GALLATIN</u>										
College Site	11D2M	4856	54	14.5	9/30	5.8	8.6	6.8	5.8	4
<u>MADISON</u>										
Red Bluff	11D4M	4800	40	2.9		New Station				
<u>SHIELDS</u>										
Battle Ridge	10D11M	6020	48	13.3	10/3	10.6	-	-	-	-
Shields River	10C4M	5850	48	15.9	10/3	11.5	-	-	-	-
<u>FLATHEAD</u>										
Desert Mountain	13A2M	6370	54	6.8	9/23	4.5	7.2	5.9	6.1	4
Marias Pass	13A5M	5250	54	8.4	9/26	3.2	5.6	4.5	4.7	6
Spotted Bear R.S.	13B15M	3700	28	5.9	9/23	0.6	4.3	3.7	3.1	4
Trout Lake	13A12M	3600	54	11.8	9/23	6.9	9.8	10.5	7.9	4



# WATER SUPPLY OUTLOOK

KOOTENAI RIVER BASIN

MONTANA

AS OF :

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Kootenai drainage in Montana is Excellent.

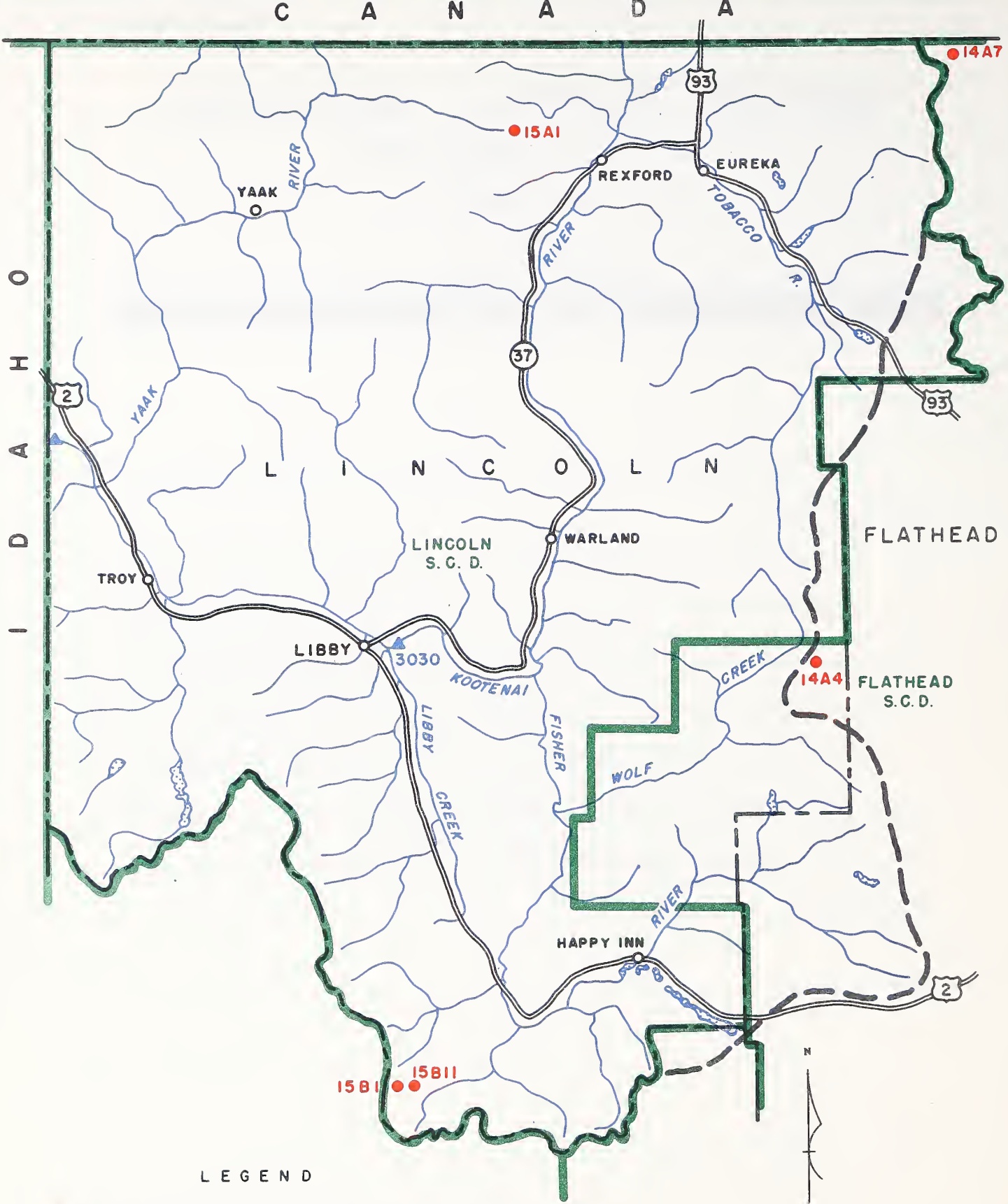
Snow survey measurements made near the first of April indicate this year's snow-pack is greater than for the same date last year. This year's snow-pack in the Kootenai basin in Canada and Montana is 38 percent above last year and 103 percent of the 1943-57 average.

Streamflow in the Kootenai River is expected to be slightly above last year for the April through September period. Streamflow in the Yaak, Tobacco and Fisher Rivers should be 10 to 20 percent greater than last year.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



# LEGEND

- 13E2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S. C. D. BOUNDARY
- WATERSHED BOUNDARY
- == HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



SCALE 10 5 0 10 MILES

# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED I

(1000 Acre Feet)

FORECAST POINT		FORECAST	FORECAST	%	MEASURED	
NO.	NAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR <sup>+</sup>	NORMAL
3030	KOOTENAI RIVER Libby (at)	Apr-Sept	7815	101	7483	7723
		Apr-July	6769	101	6427	6694
3050	Leonia (at)	Apr-Sept	9000	101	8440	8907
		Apr-July	7899	101	7388	7817
(+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED I

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
15B11	Baree Creek	5500	3/31	114	52.1	36.7	-	-
15B1	Baree Mountain	6000	3/31	111	46.6	36.0	46.4	15
14A4	Brush Creek	5000	3/20	40	12.2	11.1	15.2	9
Can 10	Fernie	3500	3/29	24	8.3	4.3	9.3	15
Can 12A	Field	4200	3/30	18	5.2	3.4	5.2	15
Can 43	Gray Creek	5100	3/26	66	22.1	17.1	19.6	10
Can 33	Kicking Horse	5400	3/31	47	15.1	11.2	14.9	11
Can 20B	Kimberley	3800	3/29	30	9.3	4.4	6.8	15
Can 32	Marble Canyon	5000	3/30	49	11.3	7.1	14.0	11
Can 10A	New Fernie	4100	3/29	47	16.5	9.4	15.3	7
15A1	Red Mountain	6000	3/22	63	22.9	18.2	21.5	15
Can 8A	Sinclair Pass	4500	3/30	21	4.8	4.1	6.0	15
Can 20A	Sullivan Mine	5100	3/30	50	16.7	12.2	15.4	12
Can 41	Upper Elk River	4400	3/30	25	8.5	3.1	8.3	10
14A7	Weasel Divide	5450	3/23	102	38.6	31.5	33.4	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

## FLATHEAD RIVER BASIN

### MONTANA

AS OF :

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook in the Flathead basin is GOOD.

Snow surveys near the first of April indicate a good snow-pack in the higher elevations, but diminishing in supply at the lower elevations. A good snow-pack is present in the northern portion of the basin, with a downward trend toward the southern portion of the drainage. Over the entire Flathead basin, this year's snow-pack is 3 percent greater than last year's and 89 percent of the 1943-57 average.

The South Fork of the Flathead is forecast to flow 2,090,000 acre feet during the April through September period. This figure is 3 percent less than last year and 91 percent of the 1943-57 average. Flow in the North and Middle Forks is expected to be slightly above last year. The Swan River near Big Fork is forecast to flow less than last year.

Irrigation reservoir storage is below last year and slightly below average.

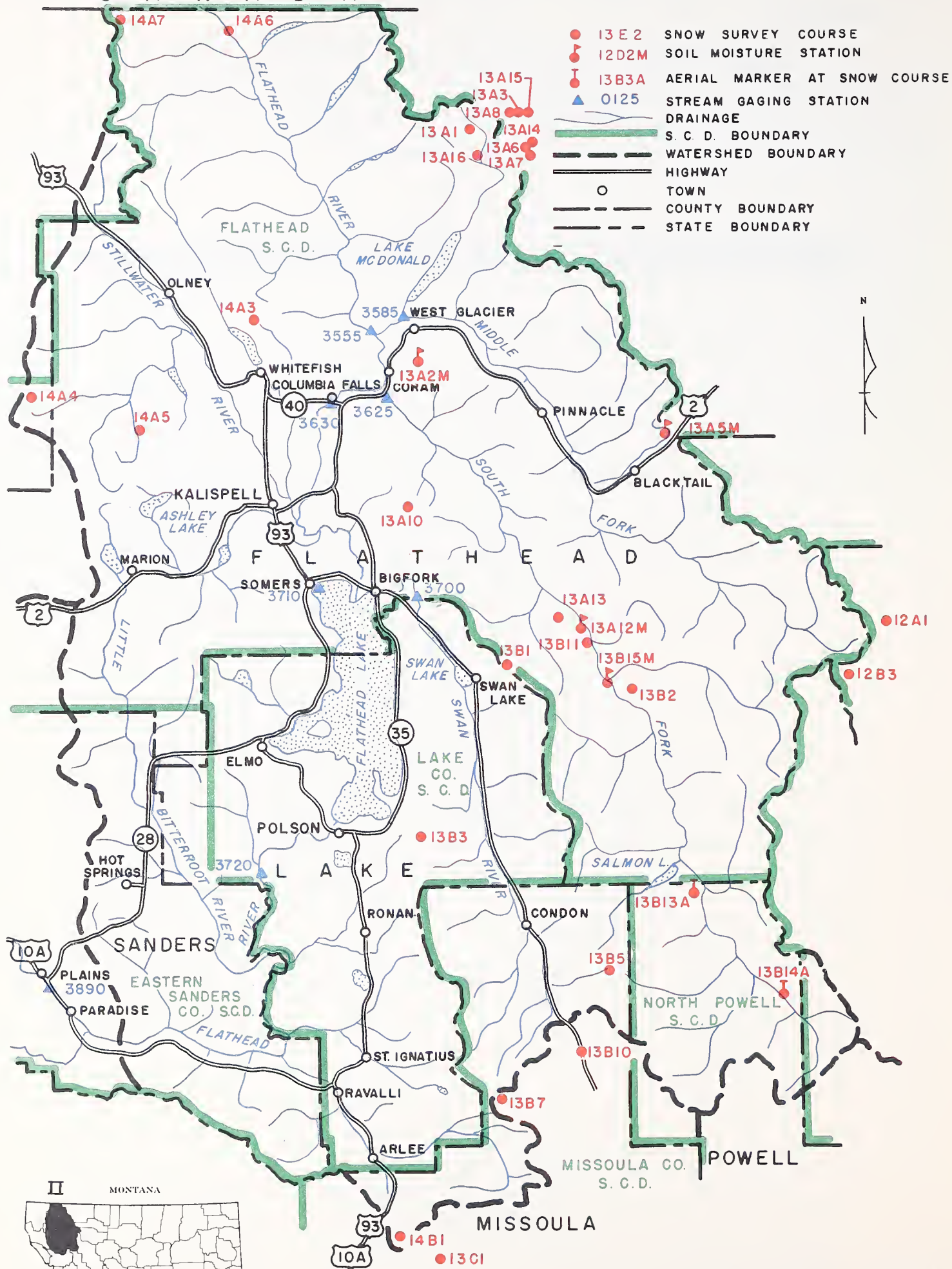
Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

C A N A D A

LEGEND



# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED II

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR <sup>+</sup>	NORMAL
3555	NORTH FORK FLATHEAD RIVER Columbia Falls (near)	Apr-Sept Apr-July Apr-June	2039 1854 1560	105 105 105	1905 1735 1470	1942 1769 1491
3585	MIDDLE FORK FLATHEAD RIVER West Glacier (near)	Apr-Sept Apr-July Apr-June	1796 1667 1423	95 95 96	1742 1614 1359	1881 1747 1480
3625	SOUTH FORK FLATHEAD RIVER Columbia Falls (nr)(17)	Apr-Sept Apr-July Apr-June	2090 1984 1729	91 91 91	2147 2039 1792	2297 2180 1900
3630	FLATHEAD RIVER Columbia Falls (at)(17)	Apr-Sept Apr-July Apr-June	6085 5588 4791	97 96 96	5888 5465 4695	6299 5845 4993
3720	Polson (near)(18)	Apr-Sept Apr-July Apr-June	7216 6722 5661	97 97 96	7377 6832 5837	7462 6939 5897
3700	SWAN RIVER Big Fork (near)	Apr-Sept Apr-July Apr-June	631 564 451	98 98 98	724 634 513	641 568 460
(17) Observed flow plus change in storage in Hungry Horse Reservoir.						
(18) Observed flow plus change in storage in Hungry Horse Reservoir and Flathead Lake.						
( + ) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF MARCH 31, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3620	Hungry Horse	3428.0	2763.0	2841.0	2022.0
3710	Flathead	1791.0	1043.0	867.8	628.8
3757	Camas	45.2	27.2	37.3	26.5
3800	Mission Valley	100.3	33.9	53.0	38.6
3805	Lower Jocko Lake	7.6	Snowbound	1.4	-

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED II

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13B14A	Basin Creek	5000	3/29	23	7.6	6.2	10.0	7
14B3	Bassoo Peak	5150	4/3	26	7.9	-	-	-
13B3	Big Creek	6750	3/30	106	45.3	45.8	43.4	15
14A4	Brush Creek	5000	3/20	40	12.2	11.1	15.2	9
13A1	Cattle Queen	4700	4/1	82	28.5	27.7	34.4	15
13A2M	Desert Mountain	5600	3/27	44	14.1	15.9	16.6	15
Can 10	Fernie	3500	3/29	24	8.3	4.3	9.3	15
14A9	Griffin Creek Divide	5150	4/3	29	8.9	9.2	-	-
14A3	Hell Roaring Divide	5770	3/21	85	32.6	33.2	31.7	15
13B13A	Holbrook	4530	3/29	19	7.0	6.6	10.4	7
14A6	Kishenehn	3886	3/29	23	6.1	6.9	10.8	15
14A5	Logan Creek	4300	3/20	21	6.1	5.7	9.8	15
13A5M	Marias Pass	5250	3/29	47	15.6	12.5	20.3	15
13A16	Mineral Creek	4000	4/1	48	18.2	20.2	-	-
Can 10A	New Fernie	4100	3/29	47	16.5	9.4	15.3	7
13B7	North Fork Jocko	6330	3/31	107	44.4	40.8	44.4	15
13A13	Quintonkon	3800	3/28	28	9.9	12.0	14.9	7
13B2	Spotted Bear Mountain	7000	3/29	44	12.6	12.0	16.0	10
13A10	Strawberry Lake	6500	3/30	94	41.9	48.6	44.0	10
13B1	Trinkus Lake	6500	4/1	106	42.0	40.1	42.4	10
13A12M	Trout Lake	3600	3/30	20	7.0	14.3	17.8	10
14B1	TV Mountain	6800	3/22	52	16.0	12.4	-	-
13B11	Twin Creeks	3580	3/30	20	7.0	9.5	10.6	7
13B5	Upper Holland Lake	7000	4/1	81	29.7	27.6	37.6	9
14A7	Weasel Divide	5450	3/23	102	38.6	31.5	33.4	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

## LOWER CLARK FORK RIVER BASIN MONTANA

AS OF:

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Clark Fork River and tributary streams below Missoula is Fair to Good.

Snow surveys near the first of April indicate this year's snow-pack is 24 percent greater than last year and 93 percent of the 1943-57 average. This season's snow-pack is confined to high elevation areas of the basin.

The April through September streamflow is forecast to be less than last year on the Clark Fork River; however, tributary streams in the lower Clark Fork basin are expected to produce more water during the April through September period than last year.

*Report Prepared by* \_\_\_\_\_

A. R. CODD AND P. E. FARNES  
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BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED III

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
3400	BLACKFOOT RIVER Bonner (near)	Apr-Sept Apr-July Apr-June	725 642 549	73 71 71	818 736 655	999 907 775
3404	CLARK FORK RIVER Milltown (above)	Apr-Sept Apr-July Apr-June	401 347 292	49 49 48	672 576 525	815 716 609
3405	Missoula (above)	Apr-Sept Apr-July Apr-June	1126 989 841	62 61 61	1490 1312 1180	1814 1620 1384
3530	Missoula (below)	Apr-Sept Apr-July Apr-June	2324 2105 1775	69 69 68	2712 2450 2202	3361 3059 2608
3545	St. Regis (at)	Apr-Sept Apr-July Apr-June	3244 2938 2480	71 71 70	3645 3286 2951	4549 4140 3551
3890	Plains (near) (18)	Apr-Sept Apr-July Apr-June	10636 9789 8211	86 86 85	11238 10226 8885	12330 11308 9625
3910	Thompson Falls (at) (18)	Apr-Sept ) Apr-July ) Apr-June )	No Forecasts (A)			
3920	Whitehorse Rapids (at) (19)	Apr-Sept Apr-July Apr-June	12093 11156 9319	87 87 86	12992 11815 10193	13932 12763 10816
(A) Thompson Falls stream measurements discontinued by USGS, 9/30/59.						
(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner						
(18) Observed flow plus change in storage in Flathead Lake & Hungry Horse Res.						
(19) Observed flow plus change in storage in Hungry Horse Reservoir, Flathead Lake and Noxon Reservoir.						
(+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF MARCH 31, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3913	Noxon	200.1	115.5	179.0	-

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED III

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
15B11	Baree Creek	5500	3/31	114	52.1	36.7	-	-
15B1	Baree Mountain	6000	3/31	111	46.6	36.0	46.4	15
13B10	Coyote Hill	4200	3/31	20	6.5	8.4	11.2	11
15C2	Fish Lake Airstrip	5000	3/29	97	39.3	33.8	40.0	5
15B10	Freezeout Summit	6800	3/27	101	36.9	25.8	36.8	15
15C1	Hoodoo Creek	6200	3/27	131	51.8	37.4	53.2	15
14C5	Lolo Pass	5230	3/23	80	31.4	24.8	36.7	14
15B2	Lookout	5250	3/30	96	37.3	28.5	39.0	15
13C8	Lubrecht Forest #6	4040	3/31	0	0	0	3.7	7
13B7	North Fork Jocko	6330	3/31	107	44.4	40.8	44.4	15
14C6	Powell R. S.	4230	3/24	30	10.2	12.0	-	-
14C4	Savage Pass	6600	3/23	27	24.7	21.2	30.3	14
14B1	TV Mountain	6800	3/22	52	16.0	12.4	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

## UPPER CLARK FORK RIVER BASIN

### MONTANA

AS OF :

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the coming irrigation season in the Upper Clark Fork drainage is Fair to Poor.

Flint Creek at Maxville is forecast to flow 23,400 acre feet from April through September, which is lower than the lowest flow recorded at this station since it was started in 1942.

Again this month, farmers and ranchers who depend upon natural streamflow for irrigation, are advised to give serious consideration to the planting of early maturing crops such as millet and grains for hay. New stands of hay and pasture should be deferred, as the water supply will be most critical during the latter part of the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems. To conserve water, irrigate only when necessary and use proper application rate.

Snow survey measurements near the first of April indicate this year's snow-pack over the headwaters of the Clark Fork and Blackfoot basins is about the same as last year, and confined to high elevations. The entire pack is only 68 percent average. In contrast to last year, this year's snow-pack overlies dry soil and much of the water in the snow-pack will be used to prime the soil.

April through September streamflow in the Blackfoot and Clark Fork Rivers is expected to be less than last year with the probability of a severe shortage later in the irrigation season.

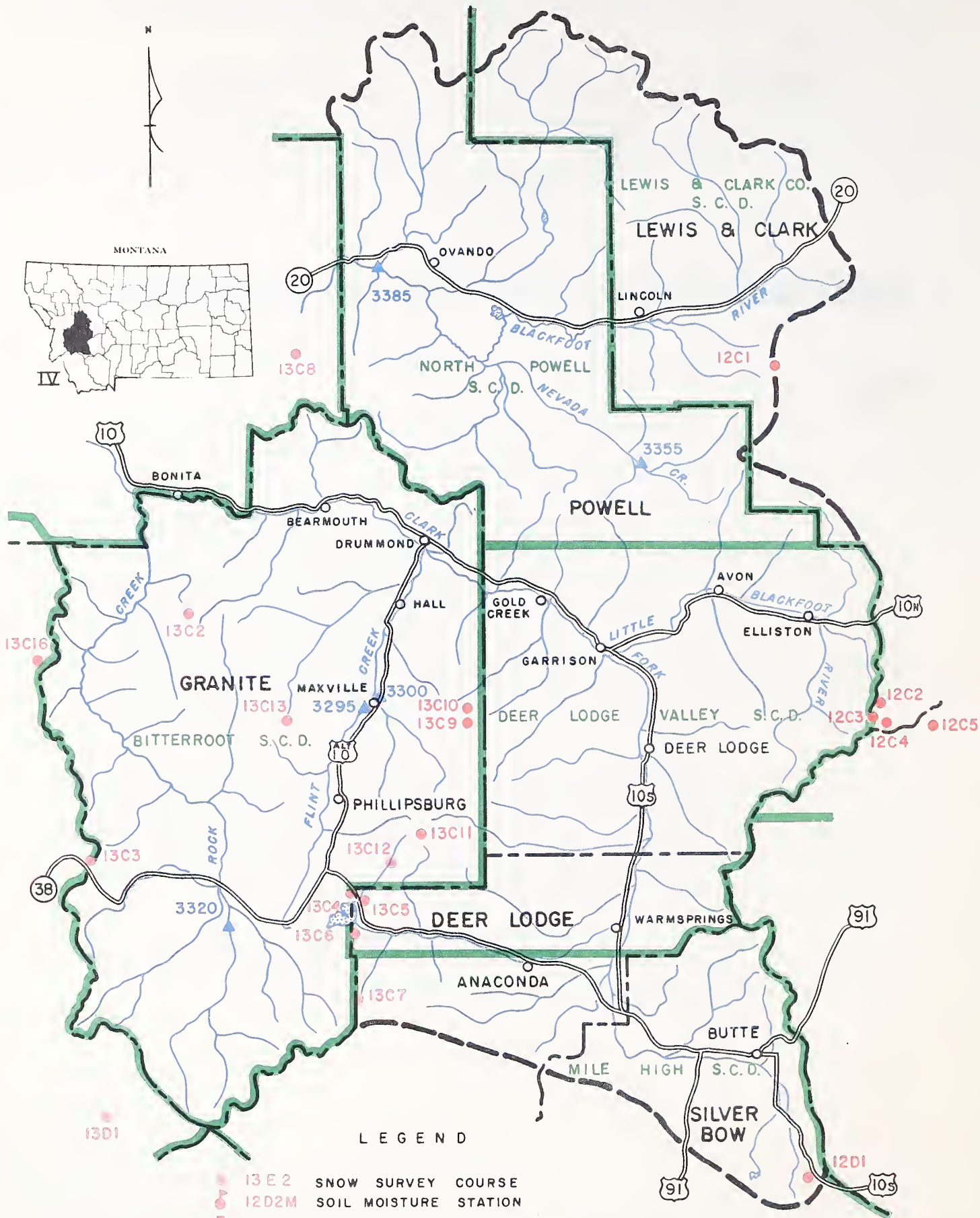
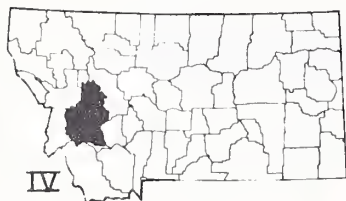
Report Prepared by

A. R. CODD AND P. E. FARNES  
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BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



MONTANA



# LEGEND

- 13 E 2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- 0125 STREAM GAGING STATION
- DRAINAGE
- S C D BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY

SCALE 10 0 10 20 MILES

# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED IV

(1000 Acre Feet)

FORECAST POINT		FORECAST	FORECAST	%	MEASURED	
NO.	NAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR <sup>+</sup>	NORMAL
3295	FLINT CREEK Maxville (at)	Apr-Sept Apr-July	23.4 18.0	51 51	- -	46.4 35.4
3300	BOULDER CREEK Maxville (at)	Apr-Sept Apr-July	16.9 15.5	60 60	- -	28.2 25.8
3320	MIDDLE FORK ROCK CREEK Philipsburg (near)	Apr-Sept Apr-July	50.2 46.3	63 64	- -	82.2 72.1
3400	BLACKFOOT RIVER Bonner (near)	Apr-Sept Apr-July Apr-June	725 642 549	73 71 71	818 736 655	999 907 775
3404	CLARK FORK RIVER Milltown (above) (14)	Apr-Sept Apr-July Apr-June	401 347 292	49 49 48	672 576 525	815 716 609
(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.						
(+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF MARCH 31, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3250	Georgetown Lake	31.0	22.6	28.8	21.6
3365	Nevada Creek	12.6	-	12.3	8.1

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED IV

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13C16	Ambrose	6475	3/30	36	11.0	8.9	-	-
13C13	Black Pine	7100	3/22	32	10.1	10.2	-	-
12C5	Chessman Reservoir	6200	3/30	9	1.2	1.6	5.1	15
13C9	El Dorado Mine	7800	3/24	50	15.0	18.6	22.6	6
13C11	Fred Burr Pass	8000	3/21	60	20.0	20.4	-	-
13C10	Gold Creek Lake	7200	3/24	39	11.5	11.2	17.7	5
13C4	Intergaard	6450	3/31	22	6.6	6.2	8.1	12
13C8	Lubrecht Forest #6	4040	3/31	0	0	0	3.7	7
12D1	Pipestone Pass	7200	4/3	15	4.9	5.6	6.0	15
13C12	Red Lion	7000	3/21	42	12.0	12.1	-	-
13C3	Skalkaho Summit	7259	3/22	67	23.3	18.0	28.2	15
13C2	Slide Rock Mountain	7100	3/23	34	11.0	11.8	15.9	15
13C5	Southern Cross	6500	3/31	15	5.1	3.0	6.1	12
12C1	Stemple Pass	6900	3/29	31	6.8	8.2	11.0	15
13C7	Storm Lake	7780	3/21	38	11.2	11.3	15.6	15
13C6	Stuart Mill	6500	3/31	15	4.9	4.1	7.1	12
12C2	Tenmile, Lower	6250	4/2	15	4.3	4.1	7.1	15
12C3	Tenmile, Middle	6800	4/1	30	7.5	9.1	11.3	15
12C4	Tenmile, Upper	8000	4/1	36	9.5	12.0	14.4	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

## BITTERROOT RIVER BASIN

### MONTANA

AS OF :

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the coming irrigation season in the Bitterroot River drainage is only Fair.

Streamflow forecasts for the April through September period are generally 5 to 10 percent less than was forecast last month.

Again this month, farmers and ranchers dependent upon natural streamflow for irrigation, are advised to give serious consideration to the planting of early maturing crops such as millet and grains for hay. New stands of hay and pasture should be deferred, as the water supply will be most critical during the latter part of the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems. To conserve water, irrigate only when necessary and use proper application rate.

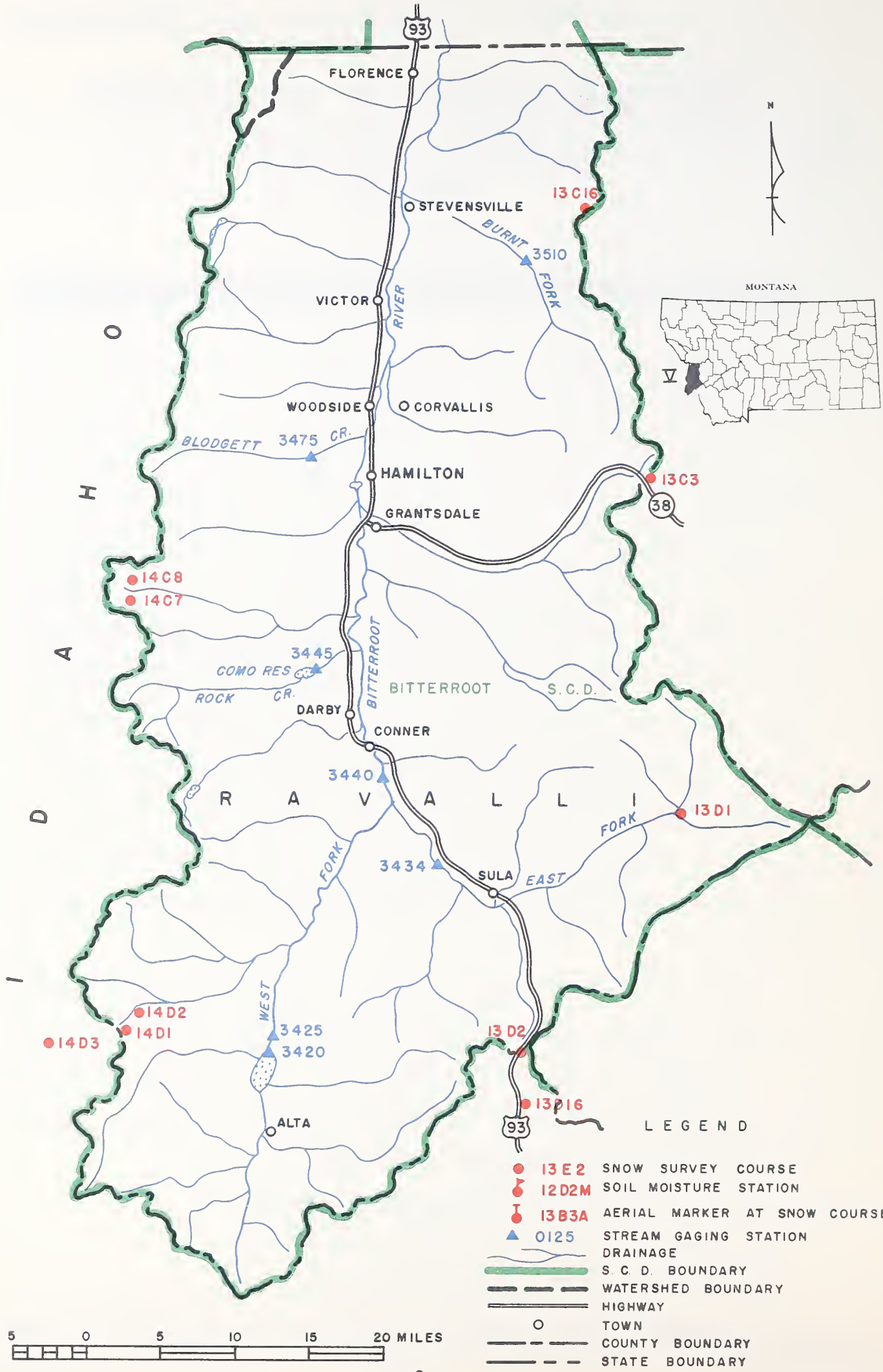
Snow survey measurements made near the first of the month indicate this year's April first snow-pack is 13 percent of the 1943-57 average.

The Bitterroot River is expected to flow less than last year during the irrigation season. Burnt Fork Creek is forecast to produce only two-thirds the normal spring and summer flow.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



LEGEND

- 13E2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S. C. D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY

SCALE 5 0 5 10 15 20 MILES

# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED V

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
3425	WEST FORK BITTERROOT RIVER Conner (near) (15)	Apr-Sept Apr-July	109 102	62 62	- -	176 164
3440	BITTERROOT RIVER Darby (near)	Apr-Sept Apr-July	454 418	77 76	521 480	587 547
3528	Missoula (near) (16)	Apr-June Apr-Sept Apr-July Apr-June	362 1198 1116 945	76 77 77 76	434 1222 1138 1027	477 1557 1450 1244
3475	BLODGETT CREEK Corvallis (near)	Apr-Sept Apr-July	41.1 38.0	88 86	- -	46.7 44.4
3510	BURNT FORK CREEK Stevensville (near)	Apr-Sept Apr-July	20.3 17.8	65 64	- -	31.2 28.0
(15) Observed flow plus change in storage in West Fork Bitterroot River Reservoir. (16) Difference in observed flow, Clark Fork above and below Missoula. (+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED V

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13C16	Ambrose	6475	3/30	36	11.0	8.9	-	-
13D1	East Fork R.S.	5400	3/28	14	4.7	4.4	7.1	15
13D2	Gibbons Pass	7100	3/28	59	18.6	16.4	25.4	15
14D3	Kit Carson	4700	3/27	19	5.7	6.9	9.0	15
14C5	Lolo Pass	5230	3/23	80	31.4	24.8	36.7	14
14C7	Lost Horse	5940	3/29	82	32.6	24.4	-	-
13D16	Moose Creek	6200	3/27	38	11.8	12.7	18.3	15
14D2	Nez Perce Camp	5580	3/27	36	10.9	11.2	15.5	15
14D1	Nez Perce Pass	6575	3/27	39	11.7	11.1	19.7	15
14C6	Powell R.S.	4230	3/24	30	10.2	12.0	-	-
14C4	Savage Pass	6600	3/23	67	24.7	21.2	30.3	14
13C3	Skalkaho Summit	7259	3/22	67	23.3	18.0	28.2	15
14C8	Twin Lakes	6510	3/29	101	40.4	32.8	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

## MARIAS, TETON, & SUN RIVER BASINS

### MONTANA

AS OF :

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Sun-Marias-Teton drainage is Fair to Good for the coming irrigation season.

Again this month, farmers and ranchers dependent upon natural streamflow are advised to give serious consideration to planting early maturing crops such as millet and grains for hay. New stands of hay and pasture should be deferred, as the water supply will be most critical during the latter part of the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems. To conserve water, irrigate only when necessary and use proper application rate.

Snow survey measurements near the first of April indicate this year's snow-pack is 36 percent greater than last year's, but is only 68 percent of the 1943-57 average.

Inflow to Gibson Reservoir is forecast at 485,000 acre feet for the April through September period, which is about 10 percent more than last year. The Marias River is expected to flow about 15 percent more water than last year during the spring and summer months.

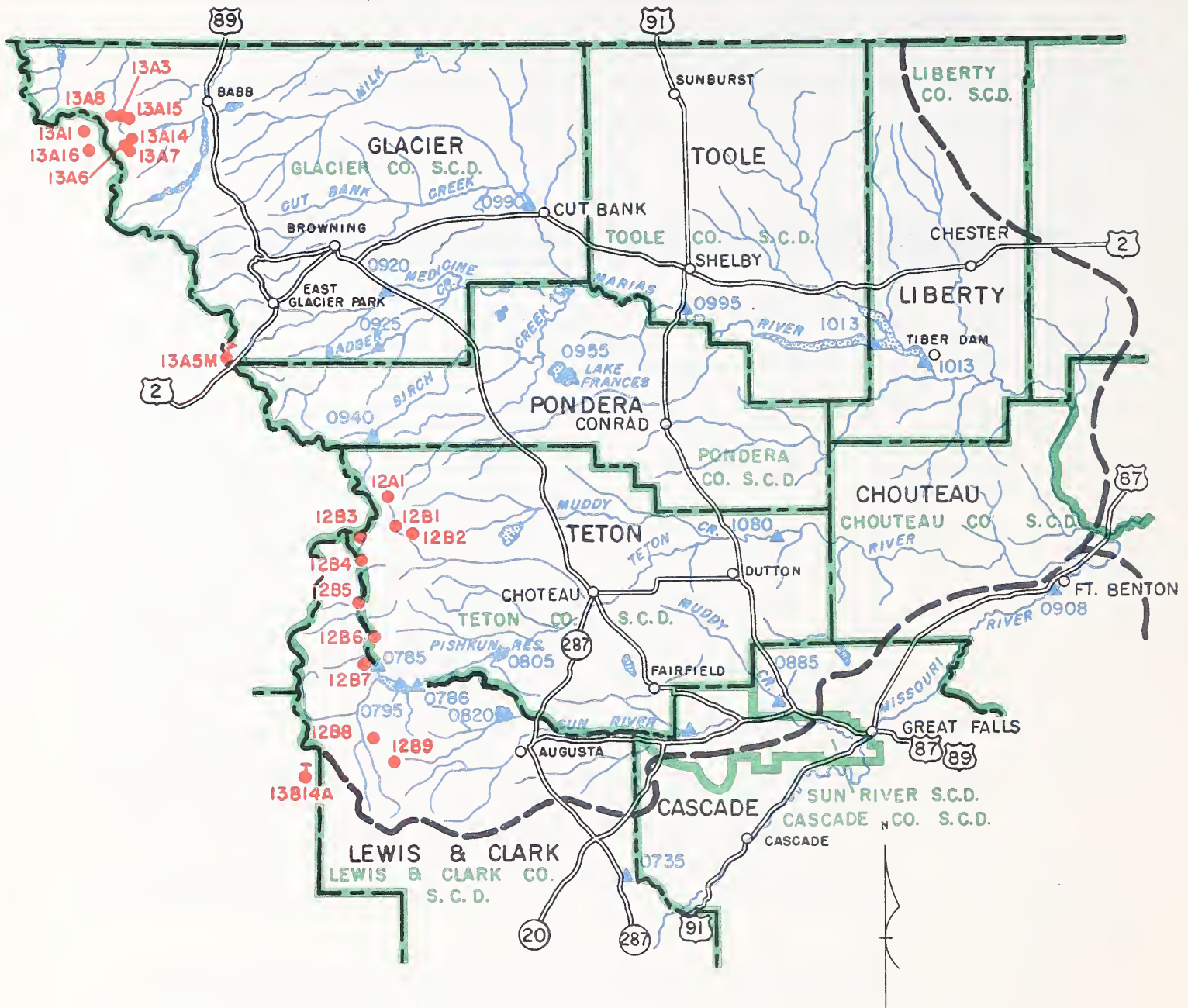
Generally, irrigation reservoir storage is less than last year and below the 1943-57 average.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

# C A N A D A



## LEGEND

- 13E2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S C D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



SCALE 10 0 10 20 30 40 MILES

# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED VI

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
0785	N.FORK OF NORTH FORK SUN Augusta (near)	Apr-Sept Apr-July	197 183	82 82	167 152	239 222
0786	SUN RIVER Gibson Dam (at)	Apr-Sept Apr-July	485 442	82 82	436 395	588 538
0995	MARIAS RIVER Shelby (near)	Apr-Sept Apr-July	507 466	77 77	436 408	659 605
(+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF MARCH 31, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
1013	Tiber	1316.0	645.5	666.3	-
0955	Lake Francis	112.0	78.6	96.2	96.0
0805	Pishkun	32.0	16.7	21.6	18.6
0795	Gibson	105.0	38.6	79.5	66.4
0820	Willow Creek	32.3	19.9	18.5	20.2
0940	Swift	30.0	15.8	30.1	24.7

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED VI

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
12B8	Benchmark	5500	3/29	21	6.6	3.7	11.2	9
12B6	Cabin Creek	5400	3/29	14	4.5	3.4	7.5	9
12B9	Five-Bull	5600	3/29	14	3.2	2.0	8.4	9
12A1	Freight Creek	6000	3/28	48	13.9	8.8	18.6	10
12B5	Gates Park	5300	3/29	26	8.3	6.3	11.7	9
12B7	Goat Mountain	7000	3/31	39	9.4	6.0	12.4	15
13A5M	Marias Pass	5250	3/29	47	15.6	12.5	20.3	15
12B2	Waldron Creek	5600	3/28	9	2.2	0	8.4	10
12B1	West Fork	6000	3/27	36	9.3	8.6	19.4	10
12B4	Wrong Creek	5700	3/29	40	14.7	10.3	16.8	9
12B3	Wrong Ridge	6800	3/29	56	19.5	17.3	24.2	9

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

## MISSOURI RIVER (MAIN STEM) BASIN

### MONTANA

AS OF :

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the tributary streams to the Missouri River Main Stem is Poor for the coming irrigation season.

Again this month, farmers and ranchers dependent upon natural streamflow are advised to give serious consideration to planting early maturing crops such as millet and grains for hay. New stands of hay and pasture should be deferred, as the water supply will be most critical during the latter part of the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems. To conserve water, irrigate only when necessary and use proper application rate.

Snow survey measurements made near the first of April indicate that water stored in this year's snow-pack is 30 percent less than last year's and 59 percent of the 1943-57 average. Soil moisture is extremely poor; as a result, considerable snow water will be needed for priming before runoff occurs.

Streamflow at Toston is expected to be 13 percent less than last year; tributary streams such as Prickly Pear Creek, Tenmile Creek, Sheep Creek and Smith River are expected to flow 40 to 60 percent average during the spring and summer months.

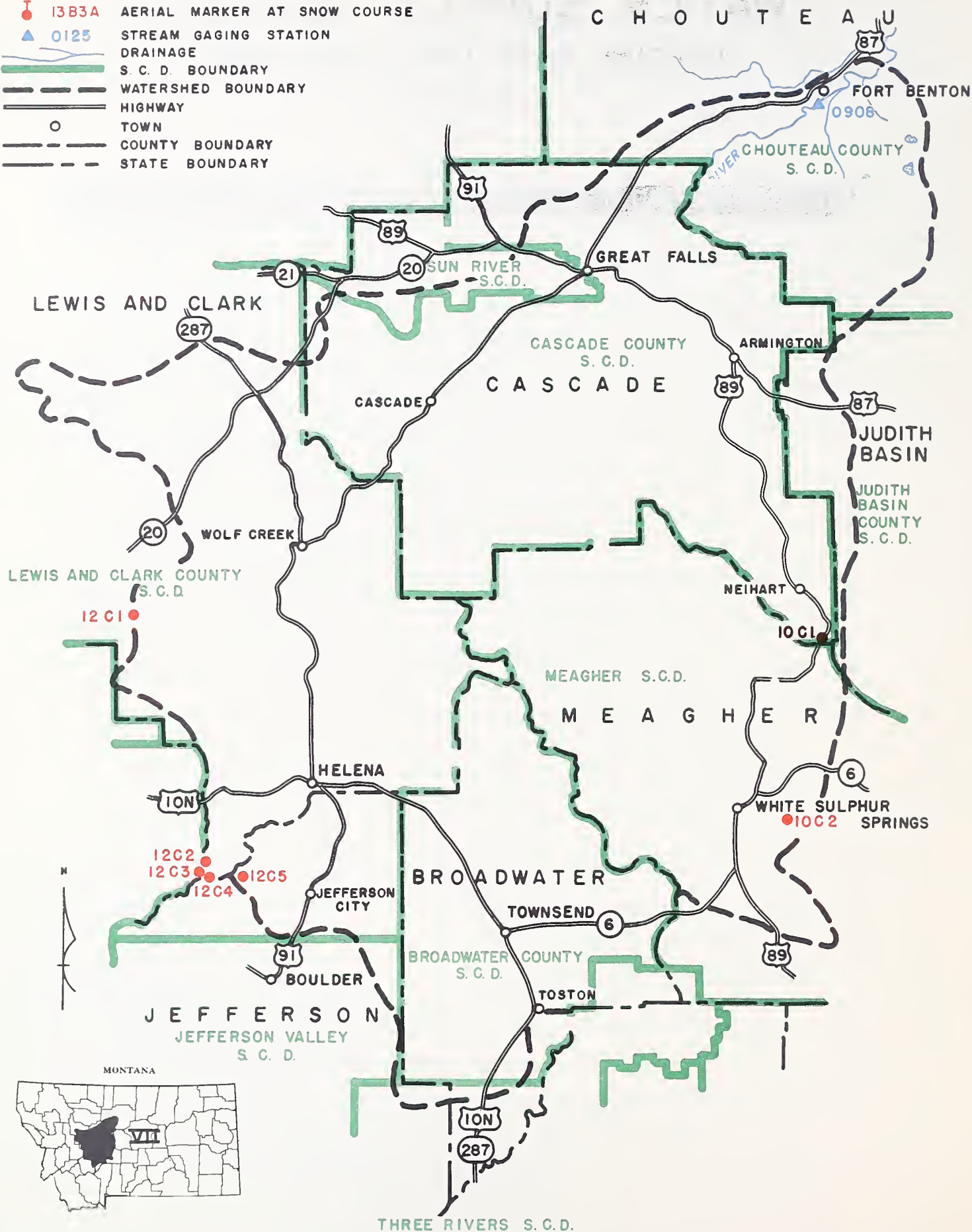
Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

# LEGEND

- 13E2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S. C. D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



SCALE 10 0 10 20 30 40 MILES

# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED VII

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
0545	MISSOURI RIVER Toston (at) (3)	Apr-Sept	1549	66	1774	2342
		Apr-July	1340	66	1528	2030
0908	Fort Benton (at) (5)	Apr-Sept	2375	66	2489	3599
		Apr-July	2044	66	2097	3076
1095	Virgelle (at) (6)	Apr-Sept	2817	64	2936	4393
		Apr-July	2415	64	2523	3803
1150	Zortman (near) (6)	Apr-Sept	3076	64	-	4806
		Apr-July	2657	64	-	4143
1320	Ft. Peck Dam (below) (7)	Apr-Sept	3005	63	-	4761
		Apr-July	2631	63	-	4181
1770	Wolf Point (near) (7)	Apr-Sept	3287	62	3158	5261
		Apr-July	2882	62	2865	4652
3300	Williston, N. D. (8)	Apr-Sept	7067	56	6280	12562
		Apr-July	6172	56	5683	11101
0615	PRICKLY PEAR CREEK Clancy (near)	Apr-Sept	11.4	48	19.4	23.9
		Apr-July	10.0	48	17.1	20.8
(3) Observed flow plus change in storage in Hebgen and Ennis Lakes. (5) Observed flow plus change in storage in Canyon Ferry. (6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs. (7) Observed flow plus change in storage in Canyon Ferry, Tiber and Fort Peck Reservoirs. (8) Observed flow plus change in storage in Fort Peck, Canyon Ferry, Tiber, Buffalo Bill and Boysen Reservoirs. (+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF MARCH 31, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0585	Canyon Ferry	2043.0	1506.0	1938.0	1328.0
0645	Lake Helena	10.4	8.1	7.2	5.3
0660	Holter Lake	81.9	11.3	71.2	54.3
0650	Hauser Lk & Lk. Helena	61.9	55.1	52.5	43.8
1315	Fort Peck	19410.0	11180.0	11360.0	11606.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

AS OF APRIL 1, 1961

5,L-16,395.2

# WATER SUPPLY OUTLOOK

## BEAVERHEAD, & JEFFERSON RIVER BASINS

### MONTANA

AS OF :

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the coming irrigation season is generally POOR.

Again this month, farmers and ranchers dependent upon natural streamflow are advised to give serious consideration to planting early maturing crops such as millet and grains for hay. New stands of hay and pasture should be deferred, as the water supply will be most critical during the latter part of the irrigation season. Those dependent upon a limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems. To conserve water, irrigate only when necessary and use proper application rate.

Snow surveys near the first of April indicate that snow cover over the entire drainage is slightly more than last year, but is only 65 percent of the 1943-57 average.

April through September streamflow is forecast at 10 to 15 percent less than last year for the Red Rock, Big Hole and Jefferson Rivers, while the Boulder River is expected to flow about 35 percent less than last year.

Storage in Ruby and Lima Reservoirs is less than last year, with Lima about 35 percent average.

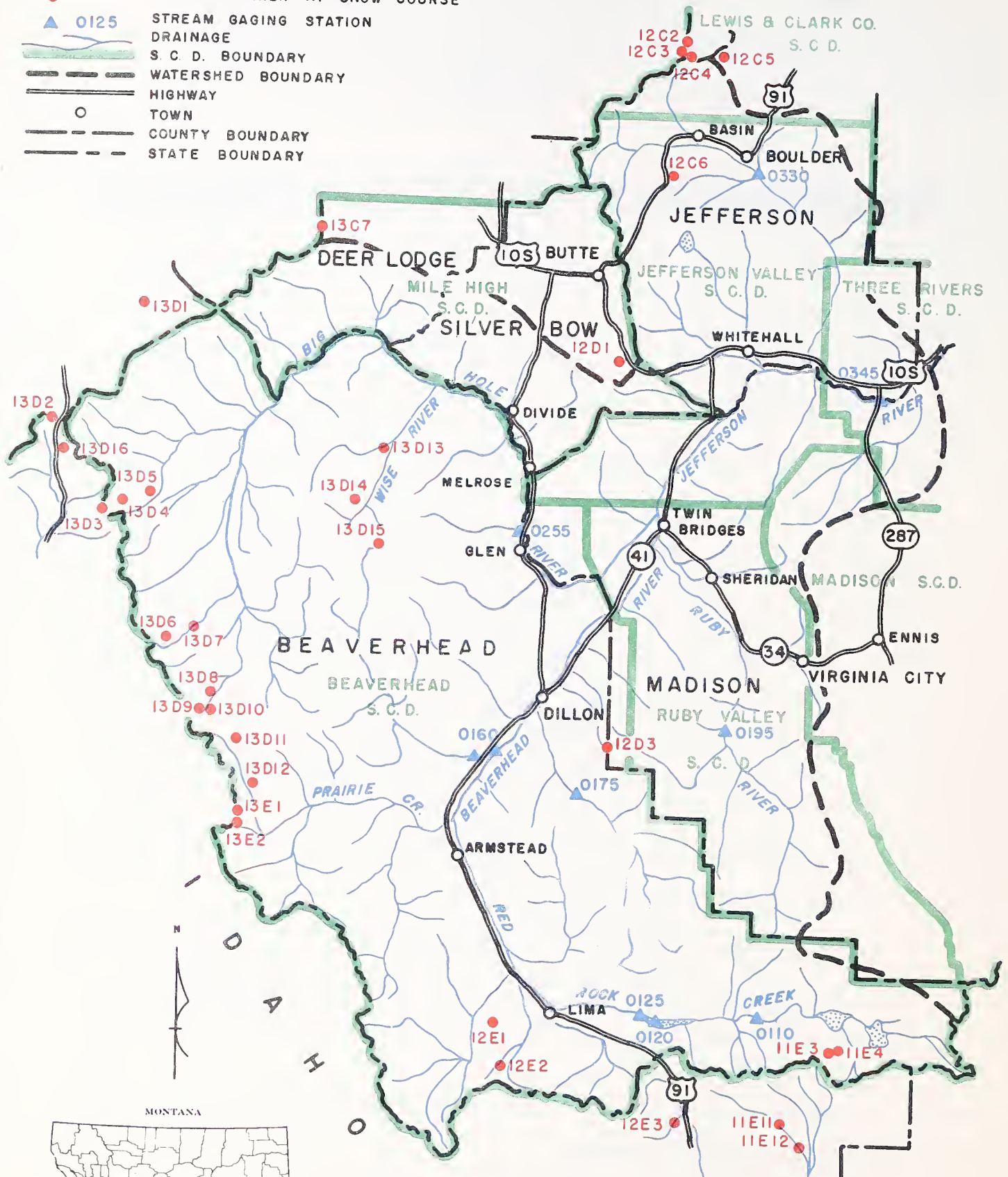
*Report Prepared by*

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

# LEGEND

- 13 E 2 SNOW SURVEY COURSE
- 12 D 2 M SOIL MOISTURE STATION
- 13 B 3 A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S. C. D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



SCALE 10 0 10 20 30 40 MILES

# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED VIII

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
0110	RED ROCK RIVER Kennedy Ranch (at)	May-Sept May-July	27.1 24.1	49 49	27.8 25.5	54.9 49.1
0125	Monida (near) (1)	Apr-Sept Apr-July	49.2 46.1	57 56	54.6 53.5	86.4 82.2
0160	BEAVERHEAD RIVER Barratts (at) (1)	Apr-Sept) Apr-July)	No Forecast (B)			
0255	BIG HOLE RIVER Melrose (near)	Apr-Sept Apr-July	477 435	62 61	556 513	770 714
0330	BOULDER RIVER Boulder (near)	Apr-Sept Apr-July	48.1 45.9	60 60	73.0 69.9	79.9 76.5
0345	JEFFERSON RIVER Sappington (at)	Apr-Sept Apr-July	644 565	60 59	760 677	1074 958
<p>(B) Forecasts discontinued at this station because the large number of unmeasured diversions above the station determine the flow.</p> <p>(1) Observed flow plus change in storage in Lima Reservoir.</p> <p>(+) Provisional data furnished by U. S. Geological Survey.</p>						

## RESERVOIR STORAGE DATA

AS OF MARCH 31, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0120	Lima Ruby	84.0 38.8	11.8 27.1	28.9 32.4	33.9 25.9

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED VIII

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13D14	Anderson Meadow	7000	3/21	20	4.5	5.1	9.2	10
13D4	Below Big Hole Pass	6900	3/22	35	8.7	9.9	15.9	10
13D3	Big Hole Pass	7240	3/22	39	10.4	10.7	19.0	10
13D10	Bloody Dick	7600	3/23	31	9.4	8.3	12.7	10
11E11	Blue Ledge Mine	6700	3/31	43	14.1	8.4	17.3	15
12E3	Camp Creek	6800	3/29	25	6.1	5.8	10.4	15
12C5	Chessman Reservoir	6200	3/30	9	1.2	1.6	5.1	15
13D5	East Boundary	6700	3/22	14	3.8	4.2	9.5	10
13D15	Elk Horn	8450	3/31	26	6.4	6.6	10.7	15
13D2	Gibbons Pass	7100	3/28	59	18.6	16.4	25.4	15
13D9	Gold Stone	8100	3/23	37	10.0	11.3	16.7	10
13D8	Jahnke Creek	7340	3/23	24	6.7	8.1	12.5	10
11E12	Kilgore	6200	3/31	31	9.5	6.4	10.3	15
11E4	Lakeview Canyon	6930	3/29	34	9.6	7.3	10.9	10
11E3	Lakeview Ridge	7400	3/29	29	7.6	5.4	10.0	10
13E1	Lemhi Pass	7480	3/28	28	6.5	6.8	10.0	10
12E2	Limekiln	6950	3/28	0	0	0	1.7	10
13D6	Miner Forks	7300	3/24	36	9.4	9.2	13.8	10
13D7	Miner Lake	6720	3/24	23	5.9	6.5	9.1	13
13D16	Moose Creek	6200	3/27	38	11.8	12.7	18.3	15
12C6	Picnic Grounds	6500	3/31	7	2.1	2.6	4.5	12
12D1	Pipestone Pass	7200	4/3	15	4.9	5.6	6.0	15
13D11	Selway Junction	6800	3/27	25	6.9	5.6	9.7	10
13C7	Storm Lake	7780	3/21	38	11.2	11.3	15.6	15
12C2	Tenmile, Lower	6250	4/2	15	4.3	4.1	7.1	15
12C3	Tenmile, Middle	6800	4/1	30	7.5	9.1	11.3	15
12C4	Tenmile, Upper	8000	4/1	36	9.5	12.0	14.4	15
13D12	Terrell Creek	6650	3/27	9	3.2	0.9	5.1	10
13E2	Trail Creek	7090	3/28	29	6.2	7.8	9.4	10
11E1	White Pine Ridge	8850	3/28	22	4.2	3.0	6.4	10
13D13	Wise River	6300	3/21	9	2.7	3.8	5.9	10

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

MADISON, & GALLATIN RIVER BASINS

MONTANA

AS OF :

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the coming irrigation season in the Madison and Gallatin River basins is FAIR to POOR.

Again this month, farmers and ranchers dependent upon natural streamflow are advised to give serious consideration to planting early maturing crops such as millet and grains for hay. New stands of hay and pasture should be deferred, as the water supply will be most critical during the latter part of the irrigation season. Those dependent upon limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems. To conserve water, irrigate only when necessary and use proper application rate.

Snow surveys near the first of April indicate this year's snow-pack is 29 percent greater than last year's, and 81 percent of the 1943-57 average. Low elevation snow is much below average.

April through September streamflow is forecast slightly more than last year on the Madison River; however, the Gallatin River and Hyalite Creek are forecast 15 to 20 percent less than last year. The East Gallatin River is expected to flow 30 percent less than last year and 54 percent of the 1943-57 average.

Soil moisture is deficient; much of the snow water will be required to prime these soils.

*Report Prepared by*

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED IX

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	FORECAST % NORMAL	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
0375	MADISON RIVER West Yellowstone (near)	Apr-Sept Apr-July	174 131	80 80	171 128	216 165
0385	Grayling (near) (2)	Apr-Sept Apr-July	353 282	79 79	327 247	448 357
0410	McAllister (near) (3)	Apr-Sept Apr-July	625 507	83 83	620 480	756 613
0435	WEST GALLATIN RIVER Gateway (near)	Apr-Sept Apr-July	353 298	77 76	416 353	459 395
0500	Hyalite Cr. R.S.(at)(4)	Apr-Sept Apr-July	29.2 25.1	81 81	35.4 30.6	36.1 31.0
0480	EAST GALLATIN RIVER Bozeman (at)	Apr-Sept Apr-July	24.9 21.9	54 54	42.7 36.9	46.4 40.7
0525	GALLATIN RIVER Logan (at)	Apr-Sept Apr-July	327 281	67 67	420 352	492 422
(2) Observed flow plus change in storage in Hebgen Lake. (3) Observed flow plus change in storage in Hebgen and Ennis Lakes. (4) Observed flow plus change in storage in Hyalite Reservoir. (+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF MARCH 31, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0380	Hebgen Lake	345.0	152.1	8.9	208.3
0405	Ennis Lake	41.0	37.9	38.2	35.3
0500	Middle Creek	8.0	3.8	4.4	4.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED IX

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
11E9	Big Springs	6500	3/29	56	19.8	11.0	23.6	15
10D4	Devil's Slide	8100	3/29	58	17.1	23.0	21.2	15
11E5	Hebgen	6550	3/30	32	9.7	7.6	12.6	15
10D3	Hood Meadow	6600	3/28	26	7.6	7.9	9.8	15
11E10	Island Park	6315	3/30	45	15.0	8.9	17.8	15
11D5	Jack Creek	7600	3/29	10	3.6	-	-	-
10D1	New World	6700	3/25	28	9.3	9.2	10.6	15
10E2	Norris Basin	7500	3/31	31	8.7	6.6	10.3	12
11D3	North Meadow	7500	3/30	36	9.5	-	-	-
10D10	Sacajawea	6550	3/27	39	10.0	12.5	-	-
11E6	Twenty-One Mile	7150	3/30	46	14.8	8.8	19.2	15
11E8	Valley View	6500	3/29	42	13.4	8.0	16.4	15
11E7	West Yellowstone	6700	3/30	30	9.3	5.4	12.7	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

JUDITH, & MUSSELSELL RIVER BASINS

MONTANA

AS OF :

APRIL 1, 1961

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the coming irrigation season in the Judith and Musselshell River basins is POOR.

Again this month, farmers and ranchers dependent upon natural stream-flow are advised to give serious consideration to planting early maturing crops such as millet and grains for hay. New stands of hay and pasture should be deferred, as the water supply will be most critical during the latter part of the irrigation season. Those dependent upon limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems. To conserve water, irrigate only when necessary and use proper application rate.

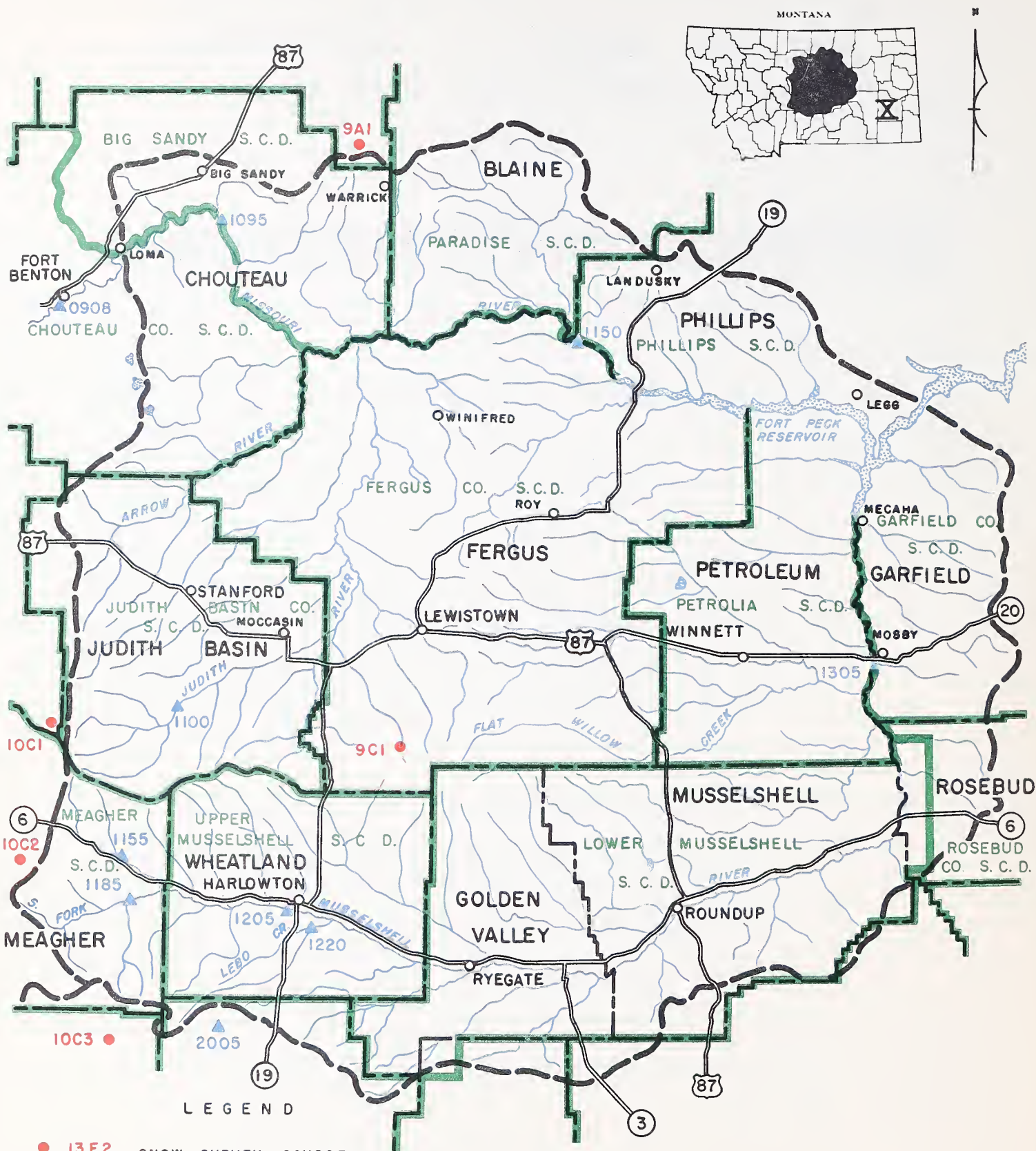
Snow surveys made near the first of April indicate this year's snow-pack is only 55 percent of last year's and 47 percent of the 1943-57 average. Lack of low elevation snow and dry soil under the snow-pack will greatly reduce the water supply for the coming irrigation season.

The April through September streamflow in the Musselshell and Judith Rivers is forecast to be less than last year and about 45 percent below average. Much below normal flow can be expected for other creeks and streams in this area.

Report Prepared by

A. R. CODD AND P. E. FARNES  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



● 13 E 2 SNOW SURVEY COURSE  
 ● 12 D 2 M SOIL MOISTURE STATION  
 ⌚ 13 B 3 A AERIAL MARKER AT SNOW COURSE  
 ▲ 0125 STREAM GAGING STATION  
 DRAINAGE  
 S.C.D. BOUNDARY  
 WATERSHED BOUNDARY  
 HIGHWAY  
 TOWN  
 COUNTY BOUNDARY  
 STATE BOUNDARY

SCALE 10 0 10 20 30 40 MILES

# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED X

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
1185	MUSSELSHELL RIVER South Fork Martinsdale (above)	Apr-Sept Apr-July	29.5 28.2	55 55	31.5 29.9	53.6 51.4
1205	Harlowton (at) (9)	Apr-Sept Apr-July	44.0 43.4	53 53	- -	83.0 82.0
1095	MISSOURI RIVER Virgelle (at) (6)	Apr-Sept Apr-July	2817 2415	64 64	2936 2523	4393 3803
1150	Zortman (near) (6)	Apr-Sept Apr-July	3076 2657	64 64	- -	4806 4143
(6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs. (9) Observed flow plus change in storage in Durand and Martinsdale Reservoirs. (+) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF MARCH 31, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
1165	Durand	7.0	4.3	6.5	5.3
1105	Ackley	5.8	-	4.1	4.3
1190	Martinsdale	23.1	4.0	7.5	10.2

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED X

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
10C5	Bald Ridge	7500	3/24	29	8.4	-	-	-
9C1	Crystal Lake	6100	3/31	16	4.7	14.4	11.8	15
10C2	Grasshopper	7000	3/30	7	1.6	3.6	5.6	15
10C1	Kings Hill	7950	3/29	37	9.1	11.9	13.8	15
10C3	Porcupine	6500	3/24	16	4.8	5.0	6.8	15
9A1	Rocky Boy	5200	3/31	0	0	2.1	5.2	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

UPPER YELLOWSTONE RIVER BASIN

MONTANA

AS OF :

APRIL 7, 1961  
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the coming irrigation season in the Upper Yellowstone drainage is FAIR to POOR.

Again this month, farmers and ranchers dependent upon natural streamflow are advised to give serious consideration to planting early maturing crops such as millet and grains for hay. New stands of hay and pasture should be deferred, as the water supply will be most critical during the latter part of the irrigation season. Those dependent upon limited water supply should consider summer fallowing part of their cropland for weed control, or defer cropping to facilitate land leveling or revision of irrigation systems. To conserve water, irrigate only when necessary and use proper application rate.

Snow surveys made on or about April first indicate this year's snow-pack is 15 percent greater than last year's, but only 72 percent of the 1943-57 average. Lower elevation snow is deficient in all areas.

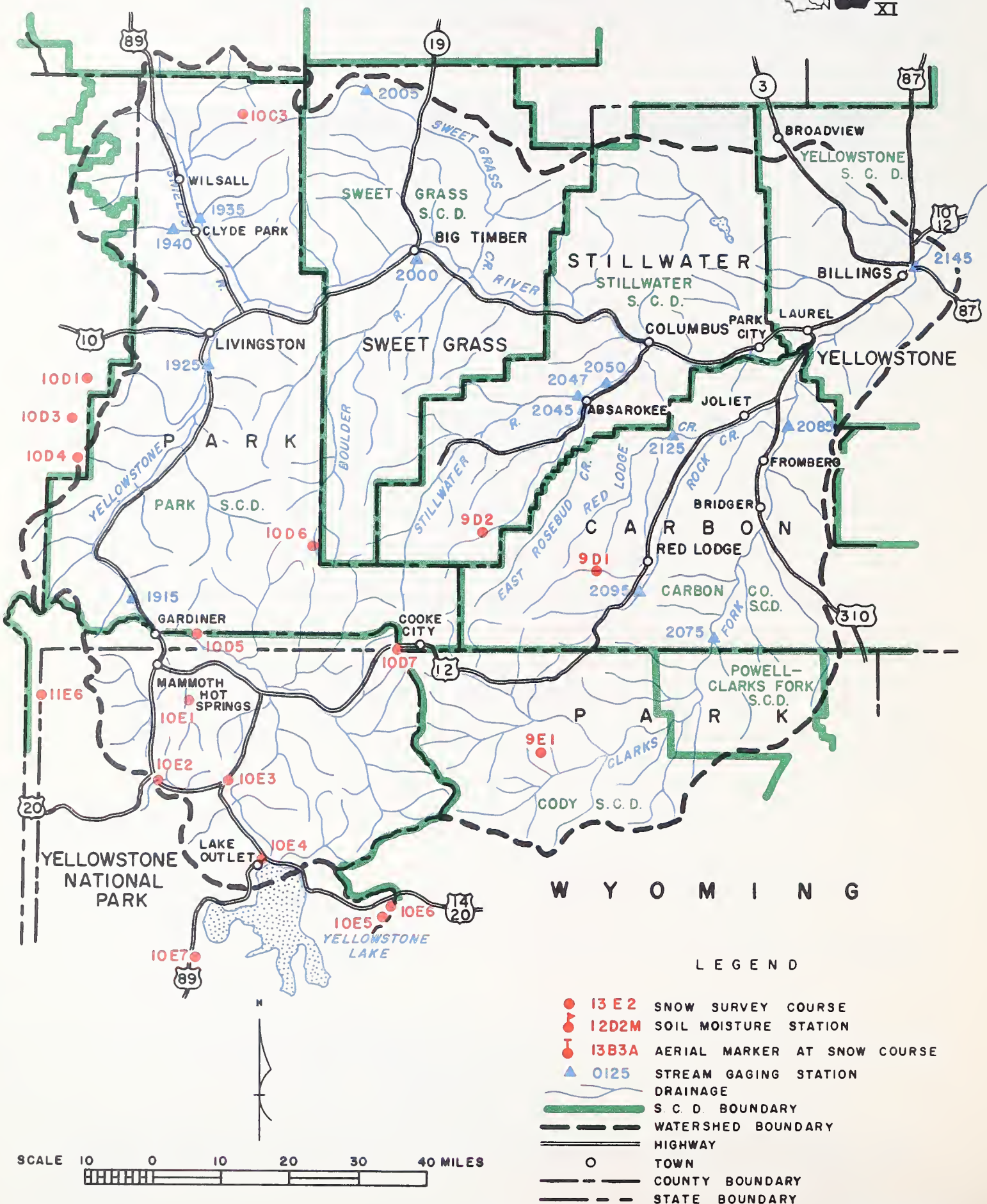
Streamflow is expected to be slightly greater than last year in most streams originating at the higher elevations.

Rock Creek is forecast to flow 64,000 acre feet from April through September, which is about 10 percent less than last year.

Report Prepared by

A. R. CODD AND P. E. FARNES  
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



# WATER SUPPLY FORECASTS

AS OF APRIL 1, 1961 - WATERSHED XI

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED	
NO.	NAME				LAST YEAR	NORMAL
1915	YELLOWSTONE RIVER Corwin Springs (at)	Apr-Sept Apr-July	1421 1158	72 71	1322 1108	1980 1649
1925	Livingston (near)	Apr-Sept Apr-July	1589 1276	71 69	1527 1273	2252 1863
2145	Billings (at)	Apr-Sept Apr-July	2770 2377	65 65	2526 2176	4261 3657
3090	Miles City (at) (13)	Apr-Sept Apr-July	3629 3177	54 54	2897 2569	6721 5883
3295	Sidney (near) (13)	Apr-Sept Apr-July	3530 3130	51 51	2675 2473	6921 6137
1935	SHIELDS RIVER Clyde Park (at)	Apr-Sept Apr-July	68.8 64.0	62 62	63.4 58.7	111 103
2045	ROSEBUD CREEK Absarokee (near) (12)	Apr-Sept Apr-July	151 123	56 57	131 107	267 216
2050	STILLWATER RIVER Absarokee (near) (12)	Apr-Sept Apr-July	364 318	59 59	332 279	620 523
2075	CLARKS FORK RIVER Chance (at)	Apr-Sept Apr-July	461 411	75 75	386 362	617 552
2085	Edgar (at)	Apr-Sept Apr-July	472 417	72 72	391 355	652 575
2095	ROCK CREEK Red Lodge (near)	Apr-Sept Apr-July	64.0 49.2	57 57	706 51.9	112 863
(12) Observed flow plus change in storage in Mystic Lake.						
(13) Observed flow plus change in storage in Buffalo Bill and Boysen Reservoir.						
( + ) Provisional data furnished by U. S. Geological Survey.						

## RESERVOIR STORAGE DATA

AS OF MARCH 31, 1961

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
2120	Cooney Reservoir	20.8	5.1	-	12.7
2040	Mystic Lake			5.0	5.7

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1961

WATERSHED XI

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
10C5	Bald Ridge	7500	3/24	29	8.4	-	-	-
9D1	Camp Senia	7890	3/21	12	2.7	5.0	7.3	15
10E3	Canyon	7500	4/1	45	13.3	8.7	16.0	15
10D7	Cooke City	7400	3/31	22	7.4	5.5	9.5	15
10D5	Crevice Mountain	8400	3/31	21	5.6	3.9	10.5	15
10D4	Devil's Slide	8100	3/29	58	17.1	23.0	21.2	15
10E6	East Entrance	7000	4/2	27	6.8	4.6	11.9	9
9D3	Gertrude Lake	9250	3/21	32	8.0	-	-	-
9D5	Grizzly Peak	8400	3/22	30	8.2	-	-	-
10D3	Hood Meadow	6600	3/28	26	7.6	7.9	9.8	15
10D6	Independence	8000	3/17	49	15.2	12.2	20.1	12
10E4	Lake Camp	7850	3/31	34	8.6	5.6	12.0	14
9E1	Lodgepole	8200	4/1	28	7.4	6.3	11.7	13
10E1	Lupine Creek	7300	3/31	29	8.9	6.7	11.6	14
10D12	Monument Peak	9000	3/17	65	21.2	-	-	-
10D1	New World	6700	3/25	28	9.3	9.2	10.6	15
10E2	Norris Basin	7500	3/31	31	8.7	6.6	9.9	12
10C3	Porcupine	6500	3/24	16	4.8	5.0	6.8	15
10D10	Sacajawea	6550	3/27	39	10.0	12.5	-	-
10E5	Sylvan Pass	7100	4/1	40	11.2	8.3	15.9	14
10E7	Thumb Divide	7900	3/28	58	16.1	11.8	25.8	15
9D4	Timberline Creek	8850	3/21	36	9.2	-	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# STATUS OF RESERVOIR STORAGE

March 31, 1961

BASIN & STREAM		RESERVOIR	USABLE CAPACITY 1000 A.F.	USABLE STORAGE - 1000 ACRE FEET			
				1961	1960	1943-57 Average	Years Record Used
<u>MISSOURI RIVER BASIN - WYOMING</u>							
Shoshone River	Buffalo Bill		372.5	135.2	128.0	220.6	15
Wind River	Boysen		560.0AC	106.3	139.6	228.7**	5
Wind River	Pilot Butte		31.6	24.7	26.0	18.2	15
Bull Creek	Bull Lake		152.0	58.3	36.6	60.1	15
Belle Fourche	Key Hole		190.3AC	2.7	14.8	11.7**	6
<u>MISSOURI RIVER BASIN - NORTH DAKOTA</u>							
Heart River	Lake Tschida		68.7AC	49.8	75.1	65.3**	7
Heart River	E. A. Patterson		5.6AC	4.1	5.9	5.4**	7
Missouri River	Garrison Lake		18100.0AC	4741.9	5020.9	-	-
James River	Jamestown		20.0AC	15.9	10.4	-	-
<u>MISSOURI RIVER BASIN - SOUTH DAKOTA</u>							
Belle Fourche	Belle Fourche		185.2AC	37.6	60.9	116.9	15
Cheyenne River	Angostura		90.0AC	6.5	28.8	47.2**	6
Cheyenne River	Deerfield		15.1AC	2.8	1.7	13.3**	10
Grand River	Shadehill		84.0AC	51.3	82.4	81.1**	5
Missouri River	Ft. Randall		3800.0AC	2607.0	3222.0	1736.3**	3
Missouri River	Gavins Point		320.0AC	259.2	402.7	-	-
Missouri River	Oahe		17000.0AC	4000.0T	2167.0T	-	-
Cheyenne River	Pactola		55.0AC	16.4	25.4	-	-

\*\* Average for years of record shown in 1943-57 period.

AC Active Capacity; USBR Billings

T Total Storage.



WYOMING SNOW SURVEYS ABOUT APRIL 1, 1961

No.	Snow Course Name	Elev.	Current Information			Past Record		Years Record Used in Average
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)		
						Last Year	15-Year Average 1943-57	
<u>LOWER YELLOWSTONE - WIND RIVER</u>								
9F12	Big Warm	8800	3/27	30	5.8	7.1	9.1**	6
9F4	Burroughs Creek	8800	3/29	35	8.8	7.8	15.0**	12
9F10	Dinwoodie	10000	3/30	44	8.6	9.2	13.3**	11
9F17	Dinwoodie Glaciers	10000	No Report			8.0E	-	2
9F9	Dry Creek	9500	3/30	28	5.5	4.3	7.0**	11
9F6	DuNoir	8750	3/27	20	3.4	4.9	10.1	20
9F7	Geyser Creek	8500	3/28	20	3.9	3.9	8.4**	12
9F8	Little Warm	9500	3/28	50	12.5	13.7	18.4**	12
9F14	Sheridan R.S. #2	7500	3/27	16	3.9	5.0	6.9**	6
9F3	T-Cross Ranch	8000	3/29	17	4.0	2.9	8.1	20
#10F9	Togwotee Pass	9600	3/29	71	24.0	24.6	32.1	25
#9G7	Twenty Lakes	10000	No Report			7.5E	-	2
<u>LOWER YELLOWSTONE - POPO AGIE RIVER</u>								
8G2	Blue Ridge	9500	3/24	35	7.9	6.9	13.8	21
8G5	Bruce's Camp	6500	3/23	14	4.4	4.3	-	3
9G3	Hobbs Park	10000	4/1	56	15.1	12.9	18.9**	12
9G4	Mosquito Park R.S.	9500	4/1	32	6.8	5.7	8.8*	16
8G1	Sawmill Glade	8500	3/24	32	7.5	5.9	8.6	21
#8G3	South Pass	9000	3/24	40	8.7	10.2	16.4	21
9F11	St. Lawrence R.S.	9000	3/27	23	5.6	3.3	7.6*	17
9G2	Trout Creek	8400	4/1	29	7.6	3.2	6.3**	12
<u>LOWER YELLOWSTONE - OWL CREEK</u>								
#9F19	Kirwin	10000	3/30	28	5.5	8.0E	-	1
8F1	Owl Creek	8700	3/27	32	7.6	7.8	6.1**	11
<u>LOWER YELLOWSTONE - GREYBULL RIVER</u>								
9E6	Frontier Needle	10000	3/30	29	5.5	-	-	-
9E3	Timber Creek #2	8800	3/29	20	3.6	4.7	3.6**	6
9F1	Wood River #2	8000	3/28	29	6.5	6.3	5.3**	6

\*Average for years of record shown in 1943-57 base period.

\*\*Average of all past data. - E Estimated water content.

#Adjacent drainage.



WYOMING SNOW SURVEYS ABOUT APRIL 1, 1961

No.                      Snow Course                      Elev.			Current Information			Past Record		Years Record Used in Average
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)		
						Last Year	15-Year Average 1943-57	
<u>LOWER YELLOWSTONE - SHOSHONE RIVER</u>								
9E4	Carter Mountain	7800	3/30	22	5.3	5.2		4
9F18	Younts Peak	8500	3/30	44	10.9	12.0E		1
<u>LOWER YELLOWSTONE - NOWOOD CREEK</u>								
#7F1	Bear Trap	8000	3/24	32	8.8	6.2		1
#7F2	Canyon Creek	7400	3/23	44	12.3	10.0		1
7E25	Cold Springs Camp	8700	3/31	26	6.5	5.8	7.5**	5
7E24	Medicine Lodge lks.	9500	3/31	38	10.4	9.7	11.5**	5
#7E8	Munkres Pass	9700	3/31	29	7.5	8.3	9.2**	11
#7E27	Onion Gulch	8100	3/24	29	7.2	8.3	9.0**	5
7E7	Tensleep R.S.	8300	4/2	25	7.3	7.1	7.3	24
7E35	Tyrell R.S.	8300	4/2	30	8.1	6.5	7.9**	5
7E26	West Tensleep Lake	9075	4/2	39	9.9	9.9	11.3**	5
<u>LOWER YELLOWSTONE - SHELL CREEK</u>								
#7E21	Bald Mountain	9600	3/24	61	18.8	20.7	20.0**	5
#7E20	Beaver Tongue	9200	3/24	55	16.8	18.4	19.4**	5
#7E18	Bone Spring	9200	3/27	55	13.4	16.1	17.2**	5
7E22	Granite Creek Camp	7800	4/1	Trace		0.0	3.4**	5
#7E17	Granite Pass	8950	3/27	52	14.1	15.3	16.4**	5
7E4	Ranger Creek	8800	4/1	30	7.8	6.9	9.0*	23
7E23	Shell Creek	9600	4/1	49	11.8	13.7	14.8**	5
<u>LOWER YELLOWSTONE - PORCUPINE CREEK</u>								
7E31	Five Springs Falls	7500	3/30	19	5.4	5.4	5.7**	5
#7E30	Medicine Wheel	9000	3/25	49	14.3	16.1	16.0**	5

\*Average for years of record shown in 1943-57 base period.

\*\*Average of all past data.

#Adjacent drainage.



WYOMING SNOW SURVEYS ABOUT APRIL 1, 1961

No.	Snow Course Name	Elev.	Current Information			Past Record		Years Record Used in Average
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)		
						Last Year	15-Year Average 1943-57	
<u>LOWER YELLOWSTONE - TONGUE RIVER</u>								
7E32	Big Goose #2	7700	3/29	29	7.6	6.3	7.6**	5
7E33	Burgess R.S. #2	7900	3/25	27	6.4	7.9	7.8**	5
7E34	Dome Lake #2	8800	3/29	38	9.1	9.7	10.3**	5
7E14	Gloom Creek	9300	3/26	48	12.2	14.8	13.3**	5
7E11	Sibley Lake	8000	3/28	39	9.3	9.0	9.8**	5
7E10	Steamboat Point	7500	3/28	29	7.3	7.6	7.7**	5
7E12	Sucker Creek	9000	3/26	41	11.2	12.4	12.1**	5
7E13	Wood Rock G.S.	8500	3/26	38	8.5	10.6	10.8**	5
<u>LOWER YELLOWSTONE - POWDER RIVER</u>								
7E36	Clouds Peak	10000	3/29	48	12.0E	17.0E		1
#7E28	Muddy Creek G.S.	7500	3/31	19	4.4	2.4	4.1**	5
7E5	Soldier Park	8700	4/1	24	5.4	5.6	5.4**	11
7E6	Sour Dough	8500	3/30	28	6.8	4.8	7.3	24

\*Average for years of record shown in 1943-57 base period.

\*\*Average of all past data. - E Estimated water content.

#Adjacent drainage.



WYOMING STREAMFLOW FORECASTS APRIL 1, 1961 2/

Basin and Tributary	<u>April 1 - September 30</u> Seasonal Streamflow in Thousands of Acre Feet			
	Forecast Runoff	Percent 15-Year Average	Measured Runoff 1959	15-Year Average 1943-57
NORTH POPO AGIE Milford (near)	50	58	55	86*
LITTLE POPO AGIE Lander (near)	22	45	25	49*
WIND RIVER Dubois (at)	60	55	88	110*
SHOSHONE RIVER Buffalo Bill Dam (below) (1)	650	76	397	851

All stream data taken from observed flow records with the following exceptions:

(1) Observed flow corrected for storage in Buffalo Bill Reservoir and Heart Mountain diversion.

2/ Forecasts prepared by George W. Peak, Soil Conservation Service, Casper, Wyoming.

\* Average is for less than 15 years of record in the 1943-57 period.

WSF-2  
REV. 10-59

U.S. SOIL CONSERVATION SERVICE  
BOX 855, BOZEMAN, MONTANA

### IMPORTANT NOTICE

IF YOU WISH TO CONTINUE TO RECEIVE THE SNOW SURVEY AND WATER SUPPLY FORECAST BULLETINS FOR MONTANA AND NORTHERN WYOMING UPPER MISSOURI, UPPER COLUMBIA AND YELLOWSTONE RIVERS, PLEASE SIGN AND RETURN THIS CARD, MAKING NECESSARY CORRECTIONS IN THE ADDRESS AS SHOWN. IF THIS CARD IS NOT RETURNED IN 30 DAYS WE ARE REQUIRED TO REMOVE YOUR NAME FROM THE FREE MAILING LIST.

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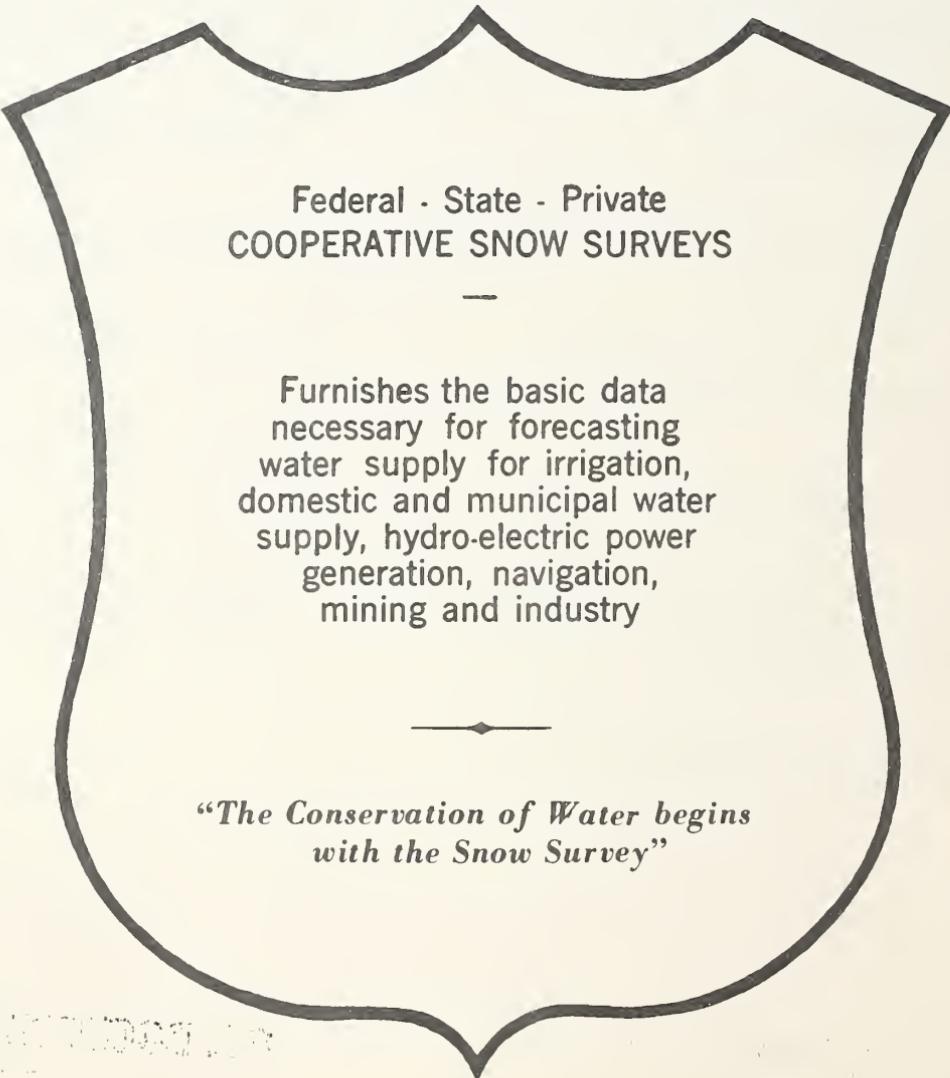
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COOPERATIVE SNOW SURVEYS

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Furnishes the basic data  
necessary for forecasting  
water supply for irrigation,  
domestic and municipal water  
supply, hydro-electric power  
generation, navigation,  
mining and industry

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*"The Conservation of Water begins  
with the Snow Survey"*